In This Issue—*Taking the Mystery Out of Selling*

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MOTOR AGE

Vol. XLII
Number 9

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CHICAGO, AUGUST 31, 1922

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ESSEX MOTOR CARS

ESSEX MOTORS—Detroit

ESSEX MOTOR CARS

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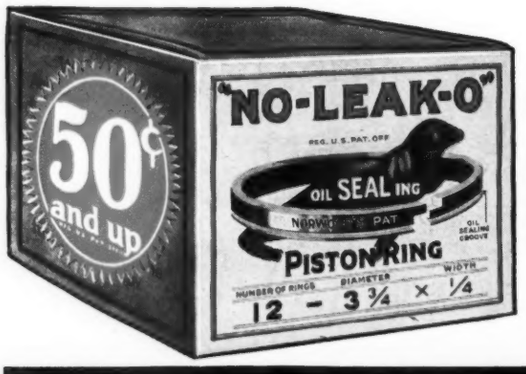
One design—for all cars—50c and up



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WON'T LEAK
because they're sealed with Oil

MOTOR AGE

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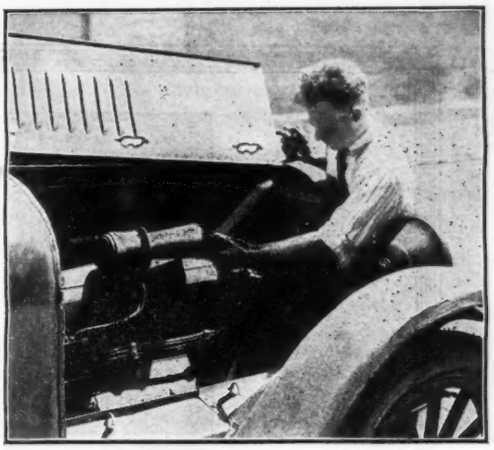

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Vol. XLII, No. 9 Chicago, August 31, 1922 $3 Per Year

MOTOR AGE

Lifting the Mistaken Idea of Mystery from Automotive Selling

By Applying Simple Merchandising Methods the Car Dealer Can Sell Trucks and Tractors to Complete His Line

By CLYDE JENNINGS

THERE has always been a demand for new passenger cars that has made sales efforts more or less unnecessary. During this long run of prosperity, with only two or three interruptions, there has been sort of a standard of salesmanship set up that is supposed to apply to the entire list of automotive vehicles.

As a matter of fact, it has not been salesmanship at all, except under peculiar circumstances. There have been cases in which the prospect wanted a much lower priced car than the salesman wanted to sell, and the salesman won. That, of course, is salesmanship. Then the circumstances are often reversed. A prospect has wanted an expensive car, and the salesman has persuaded him to take the lower priced one. This, of cours, is almost salesmanship.

But in the main, the dealer and his assistants have not sold cars very strongly. They have let the public buy them, and also many dealers and salesmen have let the public sell to them used cars at prices that were absolutely out of line with the value of the cars. It is a safe bet that there has been more salesmanship realized on by the public selling used

cars to dealers than by dealers selling new cars to the public. Usually a new car is well worth the f. o. b. price, plus freight, war tax and other incidentals. Just how poor a salesman the average automobile dealer and his associates are is well illustrated by the prices obtained for these when they are turned back to the public as used cars.

Except for occasional periods, this inefficient standard of salesmanship has served very well for the passenger car business, and from present indications the dealers will get by with it for some time, unless there is a decided change in public desire.

The crime of this sales standard comes to view when we consider the efforts of motor car dealers to get into other lines than that of new cars. They have tried trucks, tractors, motorcycles, lighting plants and other units and the number who have a score of zero on these efforts is really alarming.

This article is not intended to be in any measure a condemnation of all motor car dealers. There are many active, intelligent dealers who are engaged in properly marketing cars and who each year sell all of the cars that the factory will supply them. These men, in the main, are in the larger centers of population and are one car or one factory specialists. They make an excellent living and some of them make very handsome returns on their sidelines, such as accessories, and their maintenance business is not only profitable, but a feeder for their new car sales.

But this is not true of the great mass of dealers. Most small city dealers really cannot afford to be tied up with one car, and in many cases they cannot afford to be tied up with cars alone. They owe it to themselves and to their investment in buildings, maintenance equipment and other items of overhead to do a much larger volume of business than they are doing.

These men, most of them, have been urged to try a higher or lower priced line of cars and to take on trucks, tractors and other transportation units. Most of them have tried these lines, and when you ask them about it they shake their heads, look wise, and say that a tractor or a truck man is born, and they believe that there is much mystery in the selling of these commodities. Also they talk long and earnestly about departmentizing and about specialists being necessary. It really is quite amusing to hear them talk, when you know what other men who have little besides energy as their business asset are doing. These other dealers would not succeed if they stopped to think much over their problem. Their solution is entirely simple, they merely go out and sell and let the customer do the thinking as to whether the man who sold him this vehicle was born for that business or not.

There is no reason why there should be special problems in regard to the following lines of merchandise:

Trucks
Tractors
Motorcycles
Used Cars

In the cities there are various kinds of grocery stores. They are classified by price, and some specialize in canned goods, others in bulk goods, some are delicatessen stores, some are cash and carry, others deliver, some are cash and some prefer charge accounts. Some specialize in butter and eggs, and so it goes. There is hardly any one store that suits the housewife for all her wants.

But in the smaller town it is different. There is a complete grocery, and the food trade is seldom divided. In other words, because of the limited opportunity of appeal for customers, the storekeepers make it their purpose to keep in stock the entire line.

This is a good merchandising principle and in a last analysis selling of automotive vehicles is only merchandising. So why not run a general automotive store and sell to the people of your community what they want?

Trucks

Just why anyone should think that a man must be specially endowed to sell trucks is hard to understand. Especially is it hard to understand why an ordinary salesman moving about daily among the people of his community cannot pick up the prospects for truck sales. Then, if the man knows what he wants or knows what he wants to haul, why not sell him the trucks?

Much has been made of the peculiar differences between this truck and that and this job and that, and the cost of every kind of hauling, but as a matter of fact, most truck sales are based on the desire of the hauler to have his goods hauled on a truck. Just how economical this may be, or the exact difference of cost between a certain job of hauling if done by a three-ton or a two-ton truck, is not of as much importance as the truck itself.

Really one would think, to hear some of the truck sales engineers talk, that short-distance hauling had been the most efficient business in the world since the inception of hauling. As a mater of fact, hauling has never been efficient to any great degree, and a slip of one-tenth of one per cent in cost just now is not going to be fatal. If the truck is to be rated to the last degree of efficiency, what are we going to do about it when these same goods get on the railroad for the long haul? Certainly the peak of efficiency will falter there.

It is more than passing strange to find a buyer for an establishment who is seeking trucks and who will spend hours and days getting the last figure and curve on the efficiency of certain hauling units, and then will not spend even an hour attending a committee meeting where plans for the betterment of traffic and highways are under consideration. Perhaps his very efficient trucks are the cause of a jam at certain points and he could smooth this out, avoid the daily loss of time there, and help his fellow men, but he prefers to spend that time badgering the truck salesman, chiefly because the salesman permits it.

There is just as much of an inborn pride in the truck in the heart of the commercial hauler as there is in the motor car for the family. The chief work of the truck salesman is to find a way to cash in on this pride and sell the man a truck that will be reasonably efficient for his work and is a good all-around truck. As a matter of fact, the truck today is a much more highly developed hauling vehicle than the system of hauling can appreciate.

There is a new deal on in the selling of trucks, just as there is in the selling of high priced passenger cars. It is admitted

BUT HOW ABOUT THE TON-MILE COST OF OPERATING THIS TRUCK?
IF YOU WOULD INTEREST YOURSELF IN THOSE ROAD CONDITIONS, TON-MILE COSTS WOULD DROP MORE THAN ANY MANUFACTURER CAN MAKE THEM.

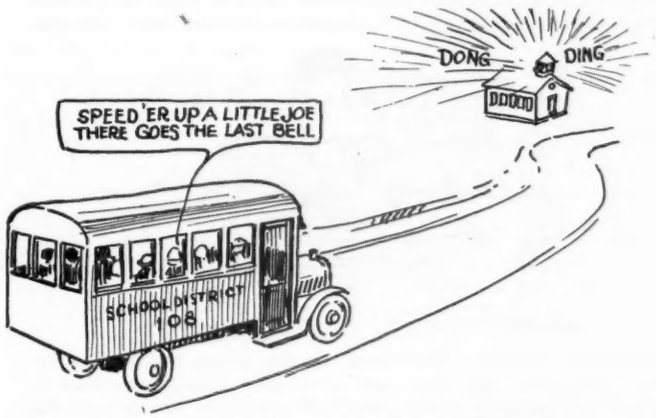
that in many communities the dealer cannot afford to buy a truck and keep it on his floor. The new idea is to supply this man with the service information regarding this particular truck, get him interested and loan him a sign "Official Service Station for the Runwell Cars and Trucks."

Then this man functions as a local salesman, subdealer, tipster, listening post, sentry or whatever you may wish to call him. It is sufficient to say that this man who is in the automotive industry is in a position to hear of contemplated purchases, if he is the right kind of a man people in his community will ask his advice, and he will get a chance to drop a good word to the prospect and at the same time let the nearby dealer know that John Jones is interested in a Runwell truck, probably a two-tonner.

Then this local man has two courses open: he can either take this man to the dealer's place of business and let the deal be closed there, or he can have a regular salesman call at his place and go with him to meet the prospect, the salesman, of course, driving the car or truck as a demonstrator.

In the passenger car field this plan of getting the services of a local dealer has worked well indeed, and the factory sales managers for the higher priced cars are much interested in the development. The same plan has been tried by a number of truck dealers, with varying success. The failures appear to be due chiefly to a lack of getting the small town man closely connected with the dealer institution.

The bus has become a prominent feature of the truck busi-



ness, and some dealers have run high totals on their sales of bus equipment. There are many sources of bus business and these have been discussed recently in MOTOR AGE. The obvious prospects for bus purchases are hotels, persons who start bus lines, street car companies for auxiliary service, factories that are isolated and wish to assist employes getting to work, school boards, municipal governments for use in the parks, automobile livery and transportation companies and others of this character. If there is a community of any size in this country that does not have one or more busses now, this condition will not continue very long. The motor bus is coming fast, so get your share of the profit from sales.

Several years ago there was a serious problem for the local truck dealer in the body for the truck after he had sold the chassis. At that time few of the factories built a large line of bodies and anything out of the ordinary at all had to be built to order in a local shop. But this difficulty has been ironed out in two ways. The factories are now building quite complete lines of bodies and are featuring these bodies in their advertising. A body for any reasonable purpose is supplied with most lines of trucks.

Another development has come in the truck body building industry. Along with a better development in the local shops, the Martin-Parry have organized a national distribution for a line of 38 models of bodies. By this plan, bodies are shipped knocked down and assembled as required. Practically all of the light truck chassis are standardized as to body requirements now and the larger trucks are beginning to conform with the S. A. E. requirements in this regard. Most of the grief has been taken out of this body problem and the rest of it will disappear in a comparatively short time.

The maintenance feature of truck sales will be taken up later.

Tractors

Just why there has been a shroud of mystery placed around the sale of tractors is hard to understand. Salesmanship is chiefly common sense and hard work. Of course the salesman must have some knowledge of the articles that he is selling, but there is no reason why he should know all there is to be known about this article. There is not the slightest reason why a tractor salesman should be a tractor engineer, a tractor operator and a county farm agent all in one.

There is in the tractor business the same social incentive to work on that there is in the passenger car and truck field. A dealer's first effort should be to build up in his community through advertising or in conversation the proper feeling of leadership on the part of the tractor farmer. The tractor owner is, without doubt, the progressive among farmers. He has the big new idea of tractor farming and the tractor dealer should help to place him as a leader in the public mind, regardless of the kind of tractor that he uses.

The economics of the tractor are not difficult to master. The tractor is primarily insurance against obstacles. Two or three operators and a tractor are good for a 24-hour day in the field when plowing or other work pushes. Otherwise the limit of the day is the limit of the horse endurance. That is the one big point for most farms. The belt work ability of the tractor has been little understood and little appreciated. This feature of the work should appeal directly to the non-farmer salesman. These economics are so self-evident, that an intelligent man applying himself to this situation should be able to make a good sales talk with mighty little assistance.

Then comes the difficult part of the job. The listing of the prospects. This, too, has been shrouded with mystery and dealers have been advised to keep complicated records of these prospects, some of them almost going to the point of recording the complexion of the farmer's daughters. The fact is that the name of the farmer and his attitude toward the tractor is the chief information desired. His financial standing is, of course, important but not so important as his attitude toward the tractor and toward his occupation of farming.

If the farmer is ambitious, a good business man, anxious to get ahead—he should be an easy sale. Any salesman in an automobile can easily get this information from a lot of farmers in a day.

Demonstrations, best staged in the field of the farmer

tractor owner, are excellent things. The salesman can take a farmer in his car and drive him over to where a tractor is working. More tractor sales have been lost than gained by a salesman attempting to tell a farmer just how he should run his place after he gets the tractor. Most farmers believe that they know something about their business and they are not at all anxious to have their entire industrial, economic and social routine upset by the purchase of iron horses. It is perhaps worse to know too much about the other man's business than not to know enough.

Always have a tractor on display where the farmers can come and look it over without too much questioning. Let them think over it with only a hint here and there. The farmer has a pride in the ownership of equipment and if left alone will often familiarize himself with such a piece of equipment as a tractor and finally sell himself more quickly than some one else could.

But there is no rule for selling tractors. Farmers are real people just as town folk are. The same method will not sell a car to every resident of Fifth avenue any more than the same method will sell a tractor to every farmer.

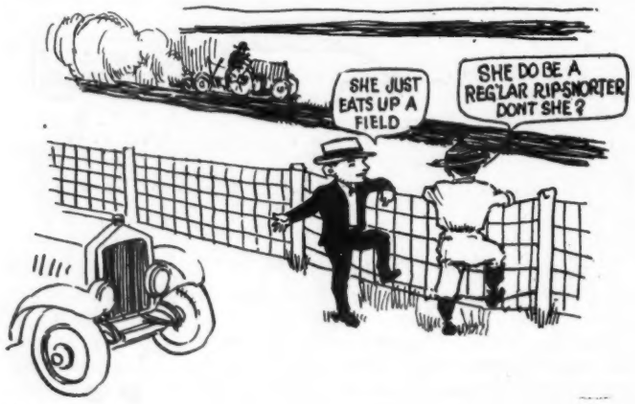
A word on tractor maintenance later.

Motorcycles

Most of us know the motorcycle as a noisy, dusty machine that has made a nuisance of itself in the neighborhood where we sleep and rest on Sunday. That impression really is an impression of the "bug" who operates this machine and the motorcycle itself is no more to blame for this reputation than an automobile would be if the owner misused it to the extent that the motorcycle is misused.

Really the motorcycle is a very efficient transportation unit for certain conditions. In England where gasoline and taxes are very high, a great many motorcycles are used by persons prominent in society and of high standing in the business world.

Because of the ill reputation the motorcycle has been given by its users, and in many cases by its dealers who as a rule are the same kind of "bugs" as the owners, it has never been given much attention by automotive merchants. There is no



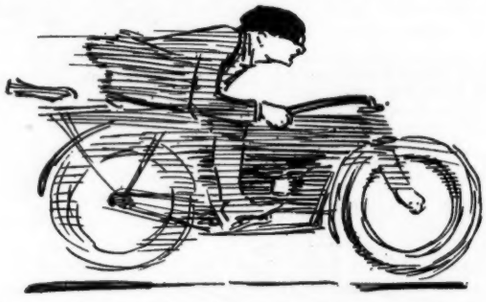
reason, however, why a transportation store should not include this efficient machine in its stock of goods.

If you can keep the racing or speed idea out of motorcycle use it is likely to develop a considerable favor in your neighborhood. There are many reasons why a farmer should add a motorcycle to his transportation equipment. It should be very fine for carrying out individual errands and, industrially, it is often used by workers who carry tools in their side cars. Many firms have developed a high degree of efficiency in the delivery of small articles by use of the motorcycle and a parcel box.

Then there is a little known type of motorcycle which is much lighter than the speed machine. This type is a wonderfully handy and economical means of transportation for the man who must go a considerable distance to work. This type of machine is becoming very popular in the smaller cities where the factory is likely to be a considerable distance from the home of the worker and street car facilities are not adequate. There is no reason why a transportation merchant in a small city cannot build up a nice trade in motorcycles and, if he sells them properly, his customers will never become a nuisance to the community.

Maintenance

Maintenance for trucks, tractors and motorcycles has been very much hampered because of an idea that each of these machines presented an individual problem in service. In detail that is true, but fundamentally there is very little difference between the service of a passenger car and other internal



combustion vehicles. The theory is the same, the same difficulties arise and the same general purpose machinery that is used in the passenger car shop will serve in most cases for the other vehicles.

There are hundreds of county seat automotive dealers in this country who know that this is true and they are capitalizing this knowledge. These men have taken over the maintenance for the farm implement dealers. These men have, as a rule, built their automotive maintenance shops into general community machine shops and in their shop they do the farm machinery maintenance work, as well as care for the farm light plants, the electric washing machines that are becoming so numerous in this country, the farm stationary engine and similar machinery.

This maintenance work is a fine field of activity and, properly managed, the dealer in an agricultural community can build up his work in such a way that his shop is busy through the winter with overhaul work and preparing the farmer for spring.

To the properly trained and educated mechanic, the tractor does not present any unusual problems. To the mechanic who has learned one or two cars by knowing what this bolt or screw is for, and who has learned only these facts and not the theory of why there is a bolt or screw, each of these machines is a mystery.

The difference between motor car and tractor repairing usually pointed out is that the passenger car can be brought to the maintenance shop, while in the case of the tractor the service must be taken to the field. This is not as difficult a problem as it might appear. Ordinarily a few tools only are required. Many dealers are overcoming the rest of the problem by fitting up a mobile quick service truck, which also serves as a tow wagon. A welding outfit is the chief equipment of this unit. A good mechanic with a few tools and a welding outfit can usually start a tractor and give it life until he can obtain the part needed. The same mobile shop is

good for truck service. In the past, there has been too much dependence put upon the the obtaining of new parts and too little on the ingenuity of the mechanic.

The tractor manufacturers have been considering the maintenance question very seriously and they have considered special equipment first. As a matter of fact, it appears from observation of successful tractor maintenance institutions that the proper education of the mechanics is the most vital point. If all concerned would lend their efforts to stripping maintenance of all kinds of mystery, it would be very helpful. The first step in this should be the publication of maintenance instruction books that can be understood by a mechanic.

Used cars

Here is another so-called problem that is a problem chiefly because most of those concerned have been led to believe that there exists somewhere a solution other than that contained in the fundamentals of plain business. The used car and used truck will cease to be a problem only when the men who buy them cease to think of them as a problem and begin to operate just as though they were plain merchandise.

The fundamental of merchandising is to buy your stock at a price at which it can be sold at a profit. The dealer who takes in a used car at an extravagant price and cannot realize on this car, has no right to consider the used car as a problem. His sale of the new car was the problem.

The automotive industry has been very proud of the fact that it has been a cash business and that price cutting did not exist. The latter part of this platform has been a matter of theory only, in many cases. Some dealers who take a high and mighty attitude about cutting prices, go right out on the curb and deliberately pay a man $300 more for a used car than the car can possibly be worth. That was merely a way of cutting prices and this dealer was only fooling himself when he did it.

In a small city near Chicago only a few weeks ago, a farmer turned automobile dealer was sold ahead on his cars. He was telling customers that he could not deliver for three weeks. He was allotting his new cars in order of the list that customers had asked for them. Finally he came to prospect No. 11 and this man had an old car for sale. Despite the fact that this farmer-dealer was a dozen or more cars behind in his deliveries, he let prospect No. 11 run the price of his old car up $400. All of the difference between the dealer and retail price of the new car was tied up in this old car, with $100 to slop over on the dealer price. So this dealer was out $100 and local expenses on the sale of this car.

USED CAR (TRADE-IN) COST $600.
RECONDITIONING & PAINTING 115.
FLOOR SPACE - (2 MONTHS) 30.
COST OF DEMONSTRATIONS 10.
EXTRA WORK (ON GUARANTEE) 11.
TOTAL COST 765.
SELLING PRICE 650.
PROFIT ?
I NEVER WAS GOOD AT FIGURING!
SOME PROBLEM!

As a matter of fact, the old car was not worth much more than the $100, and strange to say, some other oversold dealers —and some of them experienced dealers—took part in the competitive bidding for this old car.

The problem here was not a used car, but price cutting. And that is the source of most of the evils of this trade.

There are very successful new car dealers who will not buy used cars at all. There are hundreds of dealers in this country who are making excellent profits who deal only in used cars. The president of the Illinois Automotive Trades Association is a used car dealer. In Minneapolis there is a used car dealer who has been in that business for a dozen years and he is prosperous. These men say there is no used car problem that common sense and good merchandising cannot settle.

There is a movement throughout the country for better and more paint shops where used cars can be reconditioned as to appearance. This is an excellent movement and one well worthy of encouragement. It is best developed in the retail dealers' association and should be a stock company with most of the dealers owning stock. It is surprising how cheaply work can be properly socialized by a few coats of paint.

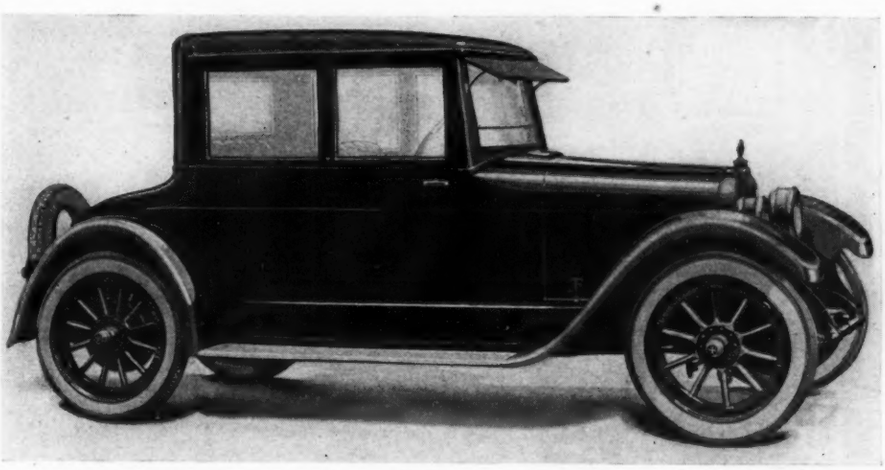
It is only a matter of good business to recondition a car so that it will give service to the buyer. That is as necessary as that a new car should be in that condition. These expenses should be charged against the car and the selling price should include a profit. The dealer who conducts his business on any other basis is merely a price cutter. The problem is the buying of the cars, not the cars.

New Four Passenger Model Coupe Added to Templar Line

A new coupe has just been added to the Templar line. This coupe is a four-passenger model. The upholstering of the first cars will be in blue Spanish leather. However, the majority of the cars that come through later will be upholstered and finished in gray cloth.

The appointments add materially to the beauty of the car. The hardware is satin finish. There are silk curtains, mounted on rollers, for the two side windows and the rear. There is a dome light with independent switch.

The windshild is slanted—a two-piece affair with the upper glass overlapping the lower. A visor over the shield makes driving safer and more comfortable. A cowl ventilator is provided to be operated from the dash.



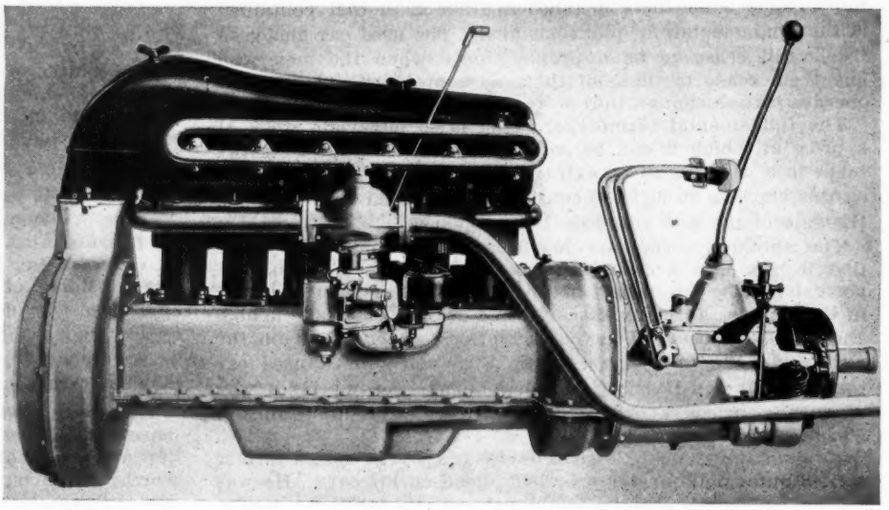
Standard equipment includes a motor driven tire pump, five cord tires and tubes with extra rim mounted on tire carrier on rear. The car is built on the standard chassis. The finish is Brewster Green or Coach Painters' Blue with full crown die stamped black fenders.

New Series Franklin Has Changed Cooling System

Unit Powerplant Also Feature of Present Car. Engine Has Greater Output for Same Size Cylinders. New Vaporizer Aids in Handling Heavy Fuel

IMPORTANT changes have been made in the cooling and carburetion systems of the new series 10-A Franklin, although in a general way the car is of the same type as the previous model. The new chassis now has a unit power plant, in place of the separate gearset design and numerous other changes have been made at various points in the car.

From a performance standpoint, power is the feature which shows the most noteworthy development. In hill climbing, this greater power represents a 20 per cent increase in ability, and in speed, a 10 per cent increase, tests made by the Franklin Company show without, however, involving any change in the size of the engine, but registering a reduction in fuel consumption.

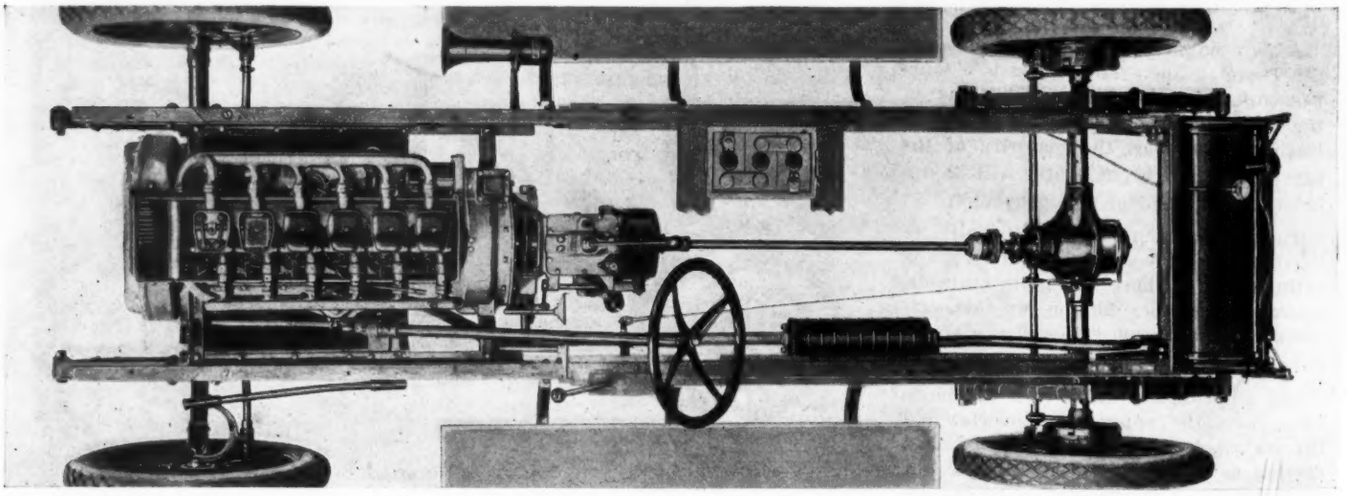


The simplicity of the Franklin cooling system is apparent, being made up by the overhead air duct in which the Sirroco fan at the front maintains a steady current of the cooling medium

The cooling apparatus functioning on the new engine and called the pressure system, develops a current of cooling air, two and one-half times that of the former Franklin system. The system takes the air in at the front and forces it over the cylinders. This is the direct opposite from the method formerly employed in which the air was drawn in by a fan set in the flywheel. A blower or fan of the Sirocco type is mounted at the forward end of the crankshaft and encased in an aluminum housing. The air forced in by the blower passes through a continuation of this aluminum housing, is carried over the upper ends of the cylinder jackets, and down across the cooling fins which are set in the walls of the cylinders.

A change has been made in the cooling fins, the ends being bent at approximate right angles so that they form what practically amounts to a closed jacket. This does away with the use of the separate outer jackets, affords greater cooling area and permits a reduction in the length of the fins themselves.

To make possible the most efficient use of the steadily lowering quality of gasoline, the new Franklin engine is equipped with a fuel transformer. This device is in the shape of a cylindrical aluminum casting with corrugated walls surrounded by a heater jacket through



View of Franklin chassis, showing new power plant and its three-point support in the chassis; new tubular driveshaft; and transmission service brake shielded from mud and water

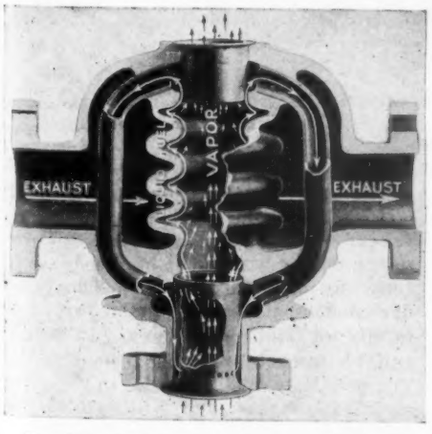
which the exhaust gas of the engine is passed. Raw gasoline on its way to the inlet manifold is led through the interior of this transformer and subjected to heat which turns it into vapor. The device is so designed that it is impossible for anything except vapor to pass through it to the inlet manifold. "Heavy ends" in the gas which were not broken up or vaporized in their first passage through the transformer are trapped and returned again to the bottom of the transformer, to be subjected once more to passage over the heated corrugated walls. This operation is repeated as many times as is necessary to produce the vapor.

Certain factors contributing to smoothness and quietness of operation have been perfected, among which the use of duralumin for connecting rods is an innovation. This new material, by cutting off 50 per cent of the weight of corresponding steel parts, makes possible a considerable lightening of reciprocating parts, succeeding thereby in reducing vibration. Franklin engineers, it will be recalled were first to introduce the use of the aluminum piston.

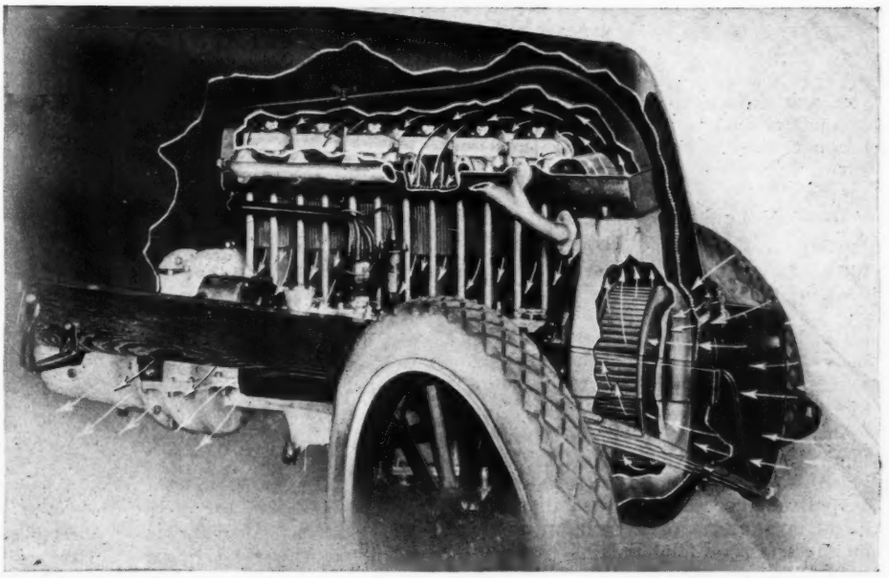
The double flywheel effect contributing further to the counteracting of vibration results from the mounting of the Sirocco Fan at the front end and the flywheel at the rear end of the crankshaft. The crankshaft itself, case hardened by a process perfected last year by the Franklin company, is made considerably shorter and of larger diameter than heretofore. It is mounted on seven bearings.

The introduction of the unit power plant in the latest Franklin, by maintaining alignment between engine, clutch, and transmission, prevents strains and consequent irregularities, the result being apparent in even engine performance and quiet operation of the transmission gears. The standard S. A. E. shaft has also been employed in the gear box and an adjustment has been put on the clutch pedal. By means of a Yale lock on the transmission, it is now possible to lock open cars either in neutral or in reverse position.

Quiet operation of the two-unit lighting and starting system, North East equipment, is coupled also with quiet starter engagement secured by the Bendix drive operating on a steel gear on the flywheel. Previous Franklins have employed a single unit electrical system.



Franklin fuel transformer, an aluminum casting so placed that the mixture must pass through it on the way to the inlet manifold and be heated by the exhaust gasses



Air is taken into the front of the air duct by means of a Sirocco Fan. It is then forced through an aluminum channel down over the cooling fins of the cylinders and out underneath the car.

A novel arrangement introduced in the latest Franklin is an air cleaner by which dust is removed from all the air that enters the carbureter. This device is of a self-acting centrifugal type employing the same principle as a cream separator. Air is drawn in through the top and a whirling action of the vanes inside, set up by suction, throws all dirt particles out through a separate passage. This instrument delivers air which is practically 100 per cent pure and will have the effect of eliminating much of the wear caused in the average engine by the mixture of dirt and oil which acts as an abrasive.

Cold weather starting, according to Franklin experiments, can be readily affected with the new engine at temperatures as low as 20 deg. below zero. For this purpose Franklin employs the same type of electric vaporizer as heretofore, but with several refinements. The control of carbureter adjustments has been greatly simplified, as pressure of a magnetic button operates both the choke and vaporizer, and a T-handle regulates the needle valve.

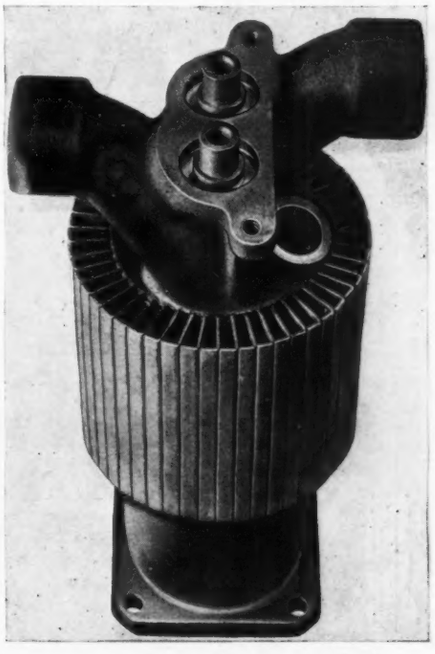
Chassis lubrication is by the Bowen Empress system by means of which either oil or grease, as required, is forced into the connection under high pressure. There are only five grease connections on the entire car, including universal joints, and oil is used for lubricating purposes at other points.

Demountable rims which answer the Franklin company's requirements for light unsprung weight, have been made standard equipment in the form of the Rubsam wheel with a hollow steel felloe.

From the standpoint of night driving, the Mirro-Tilt lights are interesting. Pressure on a bottom on the toe-board makes it possible for the rays to be projected a considerable distance ahead of normal position.

Riding qualities come in for improvement through the attachment of stabilizers as recommended equipment. It is claimed for the device that recoil action of the springs is controlled, while their action is preserved. Suppleness of the springs themselves is obtained through employment of the full-elliptics.

The latest Franklin is furnished in eight body types: Phaeton, runabout, demi-sedan, demi-coupe, sedan, brougham, coupe and touring-limousine.



Cylinder fins are shaped to form a closed jacket space for air passage, eliminating use of separate outer jacket, permitting cylinders to be placed closer together

New Speedway Roadster Offered by Stutz

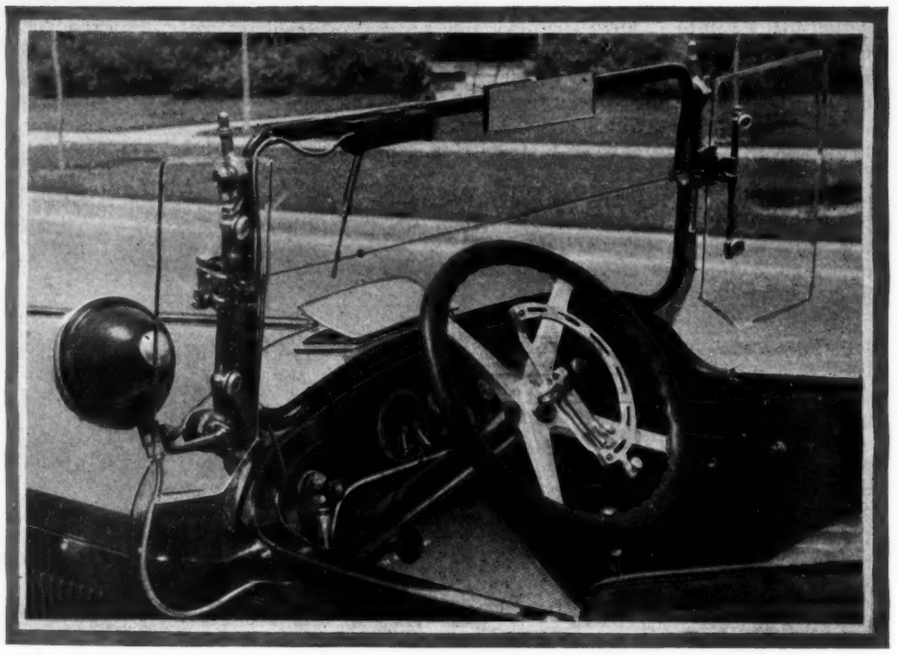
A new model, introduced by the Stutz Motor Car Co., as an addition to its line of open cars, is the Speedway Roadster, a two-passenger car replete with refinements.

One of the striking features of the Speedway Roadster is the large circular tank which fits into a well in the rear deck of the car. This is of substantial basswood, covered with patent leather duck, bound at the sides and ends with heavy leather and fitted with nickel trimmings. Inside it is lined with cretonne and holds two large suitcases.

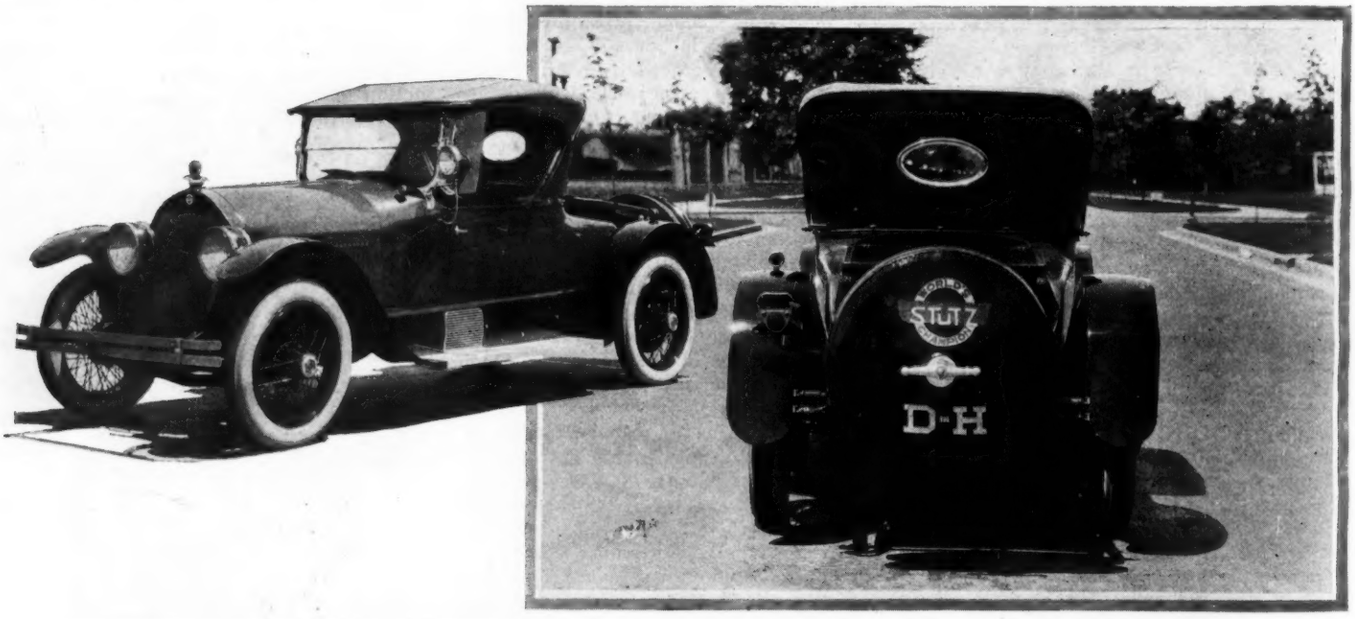
In addition to the barrel-type headlamps and spotlight, the roadster is provided with two small cowl lights of a design that corresponds with that of the headlamps, and a parking lamp mounted on the left rear fender.

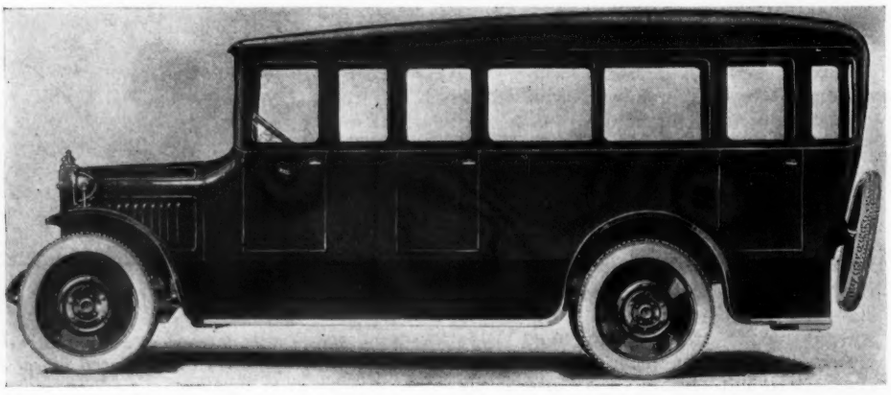
Two extra wheels, equipped with cord tires, are affixed conveniently at the rear. They are furnished with weatherproof tire covers of moleskin.

Other conveniences for comfort and safety are the heavy double-bar bumper, special plate glass side-windshields, adjustable cowl ventilator, automatic windshield cleaner, rear vision mirror and individual scuff and step plates.



This new Stutz roadster is priced at $2,760, f. o. b. factory, fully equipped.

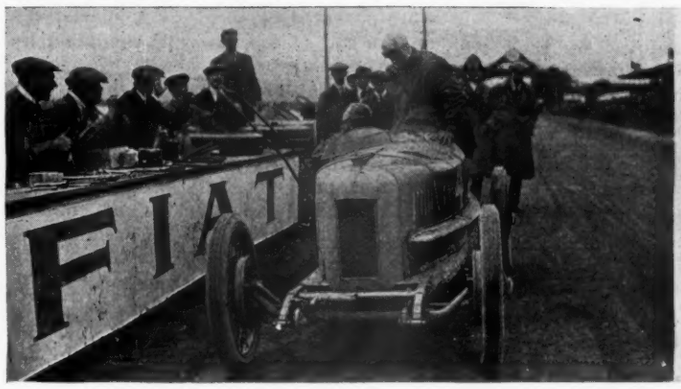


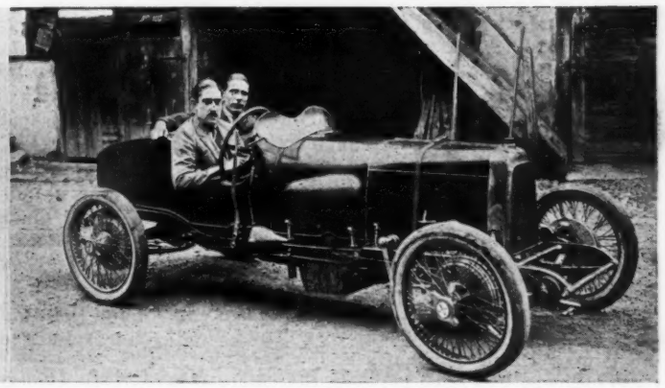


STANDARD MOTOR TRUCK CO. BUS

The Standard Motor Truck Co., this city, has brought out a special ten-passenger bus body designed along the lines of the char-a-bancs or motor coaches extensively used in England. The bus is designed to meet the demand for an intercity or sightseeing bus. It is also suitable for hotel or depot transportation. The new body is mounted on the standard model 75 chassis and will sell for approximately $2,500 f. o. b. Detroit.

The body contains a number of innovations, particularly in the rigid top construction, side curtains with glass lights, and three full-size doors on each side.





Above is shown Nazzaro, the victor, starting away after taking on gas and changing tires. To the right is Count Zbrowski on Austin Martin

Superior Speed of 122 Cu. In. Engine Shown by French Grand Prix Results

Nazzaro in Fiat Averaged 72.82 M. P. H. for 500 Miles, 1.1 M. P. H. Faster Than the 183 Cu. In. Record Made by Murphy in Duesenberg for 321 Miles

FIAT displayed overwhelming superiority and Felice Nazzaro, the 40-year-old race driver, showed that he had lost none of the skill he possessed 15 years ago, in the French Grand Prix 500 mile race at Strassbourg for cars of 122 cubic inch piston displacement. Nazzaro covered the 60 laps of the triangular course measuring 8.316 miles to the lap, a total of 498.9 miles, in 6 hrs., 17 min., 17 sec., giving an average of 79.28 m. p. h. He made one stop for gas and to change a couple of rear tires as a precaution.

Test Race of 122's

Being the first race held in Europe for cars of 122 cubic-inch piston displacement, particular interest attached to the French Grand Prix. The public did not expect the record set up last year by Murphy in the 183-in. class to be beaten, but the results showed that even over the longer distance the 122-in. Fiats were faster than the 183-in. Duesenberg which won a year ago at Le Mans. For the 500 miles Felice Nazzaro averaged 1 1/10 miles an hour faster than Murphy did over a distance of 321 miles.

Bordino, the runner up, suffered a little from plug trouble but after each stop he drove faster than ever and constantly broke his own record. He made his fastest lap in 5 min. 43 sec., or at an average of 87.23 miles an hour. He held first place on 40 out of the 58 laps he covered and second position on the 18 others. The winner held first place on 19 laps and was second on all the other laps.

The fast pace set by the Fiats was largely responsible for the failure of the competitors. The three Sunbeams had shown themselves to be the fastest in practice until the Fiats appeared on the scene. When it was discovered what Italian competition had to be met; the English engineers decided to drop their gear ratio from 3.6 to 3.8. Made on the eve of the race there was no time to try out the effect of this change, and the contest showed that the engines were running beyond the safety limit, for in each case a valve stem broke. Chassagne and Lee Guinness were the first of the Sunbeam men to drop out. Segrave, who had the fastest car, kept in the race until half distance and for some time held fourth place, when he also had to drop out with valve stem breakage.

Ballot claims that he raced with standard 122-in. chassis, specially streamlined. The best performance in this team was made by Foresti, who went 43 laps and was forced out, when holding third place, by reason of the failure of the lubrication system, which caused a bearing to run and broke a rod and a piston. Goux's Ballot ran off the road on the 33rd lap; his best position had been fifth. The third Ballot had been intended for Peter De Paolo, but the American-Italian having reached France too late to get any practice the car was given to Count Masetti, winner of the last Targa Florio race, and DePaolo went as mechanician. The car abandoned the race on the 18th lap with a broken connecting rod caused by inadequate lubrication.

The eight cylinder Rolland-Pilains proved to be green. Guyot went out on the third lap, when holding third place, with a broken crankshaft. Louis Wagner's car broke a connecting rod on the second lap. A fire started on Hemery's car on the seventh lap and he abandoned after extinguishing the flames.

Bugatti come to the start with four cars equipped with a new type eight cylinder engine. Friedrich was the fastest of these drivers and succeeded in getting the lead for a few minutes on the third lap. After this he dropped to the tail, and on the 12th lap went out by reason of breaking the gears in one of his two magnetos.

Winner Troubleless

The winning Fiat had no trouble whatsoever. Felice Nazzaro went through the race without lifting his hood and on his one stop took on gas and changed both rear tires. Bordino stopped twice for plug changes; he also took on oil during the race. On the 49th lap Bordino ran out of gas.

Fiat's pit work was good, and Felice Nazzaro and Bordino were particularly brilliant. Biagio Nazzaro was not quite so smart, but wonderful organization was shown when a leak developed on the pressure line. Biagio Nazzaro endeavored to stop the leak, but not being successful he pulled up on the following lap, lifted out his gasoline tank in two minutes and got away in 14 min. 25 sec. after having fitted a new tank and made gasoline and air line connections. This was only possible because the car had been designed to meet such an emergency.

Technical interest naturally centers

around the Fiats, designed by Engineers Fornaca and Cappa, because they won and proved themselves superior to all other entries. Quality, however, was not confined to these cars and all had interesting features. Fiat was the only competitor to use steel cylinder construction, with sheet steel water jackets around each group of three, and the two groups placed very close together on an aluminum basechamber. The valves, inclined in the head at 42 degrees, measured 39 mm. in diameter and each one had three concentric springs. A vertical shaft and bevel gearing at the rear drove the two overhead camshafts and a very light follower was used between the cam and the valve stem. There was a roller bearing between each cam.

One of the features of this car was the very successful use of a type of roller bearing designed and produced in the Fiat shops. For the crankshaft, which was in one forging with balanced throws, there were eight roller bearings. The rods were H-section with split ends and two bolts, also with roller bearings. The wrist pin worked direct in the domed head aluminum alloy piston, which had two rings. A single Scintilla magneto was used and fired K. L. G. plugs placed centrally in the head. This magneto was of the fixed type but with an ingenious system by which the timing could be varied.

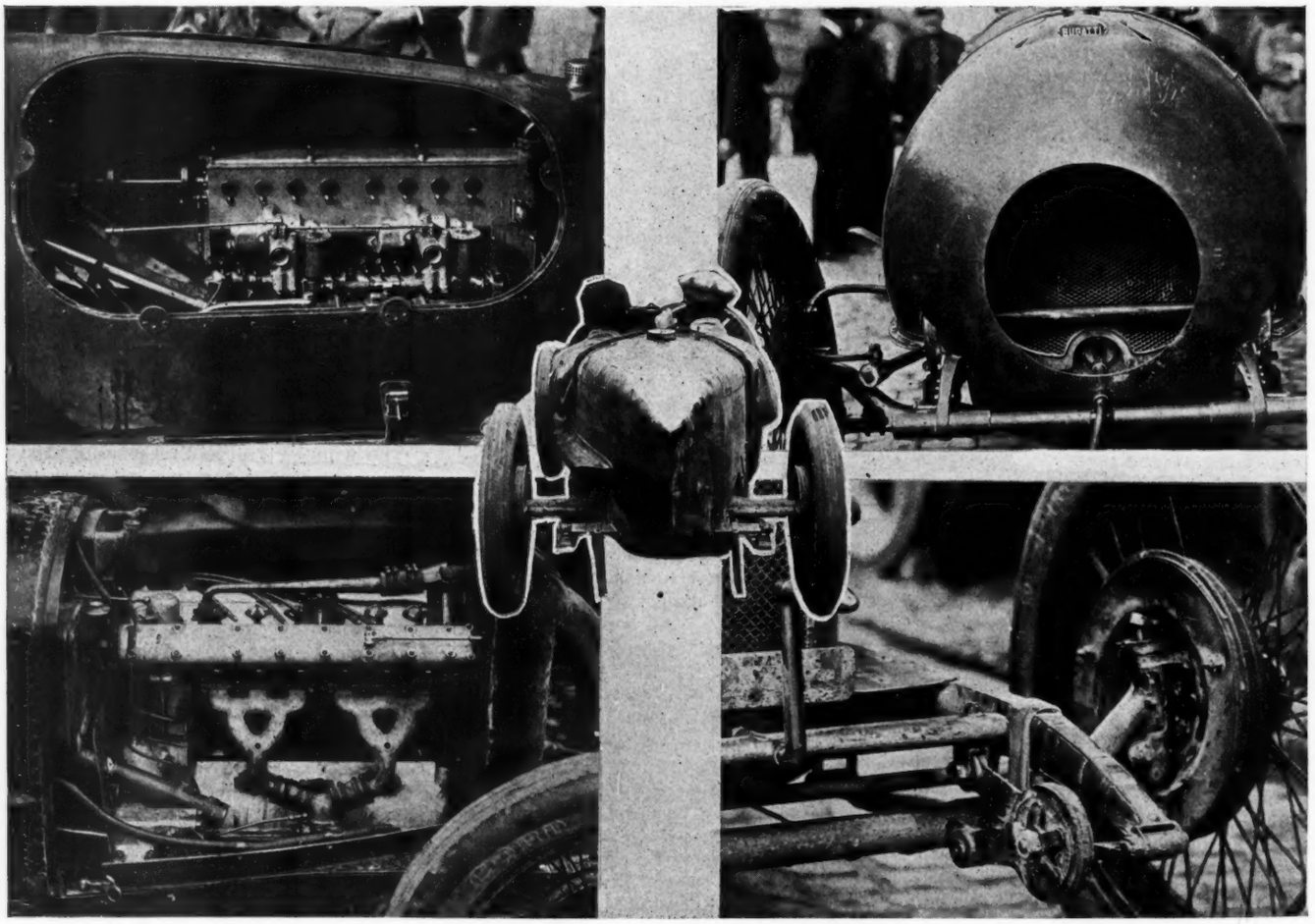
All the castor oil required for the race was contained in a 6-gallon tank behind the engine, with a reserve oil tank alongside the propeller shaft. Above the main oil tank was a smaller tank, one compartment of which contained a reserve of one gallon of gasoline and the other a small quantity of kerosene and oil for the clutch. Unit construction of engine and gearbox with direct attachment to the frame members and center control for the four speed gearbox were the general lines of the car.

Novel Axle Design

An unusual type of tubular front axle was made use of and consisted of a couple of forgings fitting one into the other, pinned together and slotted to overcome any tendency for one-half to turn in relation to the other. The short semi-elliptic springs went through the axle itself, and the lower arm of the Hartford shock absorber was bolted to a lug forged on the axle. The upper arm of the shock absorber was attached to a yoke on the oval section front cross member, instead of to the side frame members. In addition to this, rubber bands were placed around the axle and the frame, just ahead of the axle. Instead of a cam, the front wheel brakes were operated by toggles. A short lever on the top of the steering head had its inner end attached to the toggles operating the brake shoes and the end outside the drum attached by a ball and socket to a rod going through the king bolt. A chain on the lower end of this rod went around a small sprocket underneath the steering knuckle, and connection was made from the lower end of this chain to a bell crank on the axle by a rod with winged nut adjustment on its end. From this crank to the pedal, connection was by means of steel cables to the servo brake operating mechanism, these cables going through the underpan and being inside copper tubes to prevent any chafing.

All the competitors had paid very close attention to stream lining, but the Fiats were the most pleasing in this respect. This feature of design and construction had been turned over to the Fiat aviation department, which produced a body of wonderful lightness and perfect lines

Minimum weight was fixed at 1,433 lbs. The 91 cu. in. Aston-Martins were below this weight and had to carry ballast. The Fiats had the exact weight. The Bugattis averaged 1,630 lbs., and the Ballots were the heaviest, for Masetti's car scaled 1,850 lbs.



The upper left photograph shows the Bugatti 8-head engine and the lower left, the winning Fiat engine. In the center is a rear view of the Fiat, showing the streamline effect, and at the upper right is the front end of the Bugatti, reminiscent of pursuit airplane fuselage construction. The lower right is the two-piece tubular front axle and front wheel brakes of winning Fiat

World's and American Automobile Racing Records

As Recognized by the International Federation of Automobile Clubs and the American Automobile Association

Because there exists considerable confusion as to just what constitutes an officially recognized speed record, a resume of the rules of the organization which governs the awarding of such records is herewith given.

The Contest Board of the American Automobile Association determines the validity of any claim made by an individual or firm to a record. There are many classifications, the events being first classified as to whether they are competitive or non-competitive events, the competitive an dnon-competitive events are then subdivided into various divisions pertaining to the piston displacement of the entry and the type of roadbed.

The records, as printed, are considered as American records, although the miles per hour average may be greater than the world's record miles per hour average. The validity of any claim for a world's record is passed on by the International Federation of Automobile Clubs.

An instance of where an American record is faster than the world's record is apparent by comparing the time of the 12-cylinder Sunbeam for the distance of 100 miles which is listed in the column under World's Racing Records at Brooklands, and the time for the same distance listed under Speedway Records, regardless of class, non-stock. Hearne drove the Duesenberg 100 miles in 54 min. 5.80 sec., as compared to the time of the Sunbeam, which was 55 min. 35.08 sec. for the same distance.

The records printed here are recently compiled, but owing to the unavoidable delays incident to the official establishment and recording of the events, there is generally an interval of several weeks between the actual running of a record event and the time of its acceptance. These delays include transmitting of documents, technical examination of the entry, checking of timing devices and similar investigations.

The recent speed contests held at San Cotati, Cal., have brought to light such fast time that there is good reason to believe that some of the events will be entitled to at least an American record, particularly for the 50-mile distance, 183 cu. in. class.

Following are the rules of the Contest Board of the A. A. A. governing the acceptance and allowance of records, as reprinted from the 1920 Contest Rules Booklet.

RECORDS

78. RECORDS.—The Contest Board shall pass upon all records and may decline to accept any claim which, in its opinion, would not promote the interests of the sport.

No claim for a record of one mile or under and up to and including five miles will be considered by the Contest Board unless the same is taken by an automatic electrical or mechanical timing device approved by the Board, and the evidence taken by such timing device is submitted to the Board, together with the claim for the record.

No claim for record will be considered unless the sworn statements of the referee and chief timer as to the time and distance are presented to the Contest Board.

No claim for record will be considered unless there is on file with the Contest Board a surveyor's certificate of the length or distance of the track or course, with evidence that the same is level.

WORLD'S RACING RECORDS AT BROOKLANDS

(Officially Recognized by The International Federation of Automobile Clubs.)

Distance or Time		Car	Piston Displacement (Cu. Inch.)	Weight Pounds	Time or Distance	Speed (M. P. H.)	Date
½ mi.	s. s.	4-cyl. Benz	1311	3610	Normal 25.31s. / Reverse 25.22s.	71.25	22- 1-14
½ mi.	f. s.	4-cyl. Benz	1311	3610	14.076s.	127.877	8-11-09
1 kil.	s. s.	4-cyl. Benz	1311	3610	Normal 29.62s. / Reverse 31.57s.	73.57	22-12-13
1 kil.	f. s.	4-cyl. Benz	1311	3610	17.761s.	125.947	8-11-09
1 mi.	s. s.	4-cyl. Benz	1311	3610	Normal 41.26s. / Reverse 41.16s.	87.34	22- 1-14
1 mi.	f. s.	4-cyl. Benz	1311	3610	Normal 28.09s. / Reverse 29.93s.	124.10	24- 6-14
2 mi.	f. s.	4-cyl. Benz	1311	3610	58.99s.	122.05	14- 1-14
5 mi.	f. s.	4-cyl. Benz	1311	3610	2m. 35.08s.	116.08	14- 1-14
10 mi.	f. s.	4-cyl. Benz	1311	3610	5m. 19.78s.	112.57	22- 1-14
50 mi.	s. s.	4-cyl. Talbot	290	2882	27m. 2.23s.	110.96	27-10-13
100 mi.	s. s.	12-cyl. Sunbeam	552	3207	55m. 35.55s.	107.93	10-10-13
150 mi.	s. s.	12-cyl. Sunbeam	552	3207	1h. 25m. 14.94s.	105.57	10-10-13
200 mi.	s. s.	6-cyl. Sunbeam	276	2601	2h. 5m. 6.28s.	95.92	1-10-13
300 mi.	s. s.	6-cyl. Sunbeam	276	2601	3h. 7m. 45.46s.	95.87	1-10-13
400 mi.	s. s.	6-cyl. Sunbeam	276	2601	4h. 12m. 15.08s.	95.14	1-10-13
500 mi.	s. s.	6-cyl. Sunbeam	276	2601	5h. 16m. 40.01s.	94.74	1-10-13
600 mi.	s. s.	6-cyl. Sunbeam	276	2601	6h. 22m. 54.16s.	94.02	1-10-13
700 mi.	s. s.	6-cyl. Sunbeam	276	2601	7h. 29m. 36.55s.	93.41	1-10-13
800 mi.	s. s.	6-cyl. Sunbeam	276	2601	8h. 34m. 25.15s.	93.31	1-10-13
900 mi.	s. s.	6-cyl. Sunbeam	276	2601	9h. 53m. 22.29s.	91.00	1-10-13
1000 mi.	s. s.	6-cyl. Sunbeam	276	2601	11h. 6m. 38.87s.	90.00	1-10-13
1 hour	s. s.	12-cyl. Sunbeam	552	3207	107M. 1672 Yds.	107.95	10-10-13
2 hours	s. s.	6-cyl. Sunbeam	276	2601	195M. 189 Yds.	97.55	1-10-13
3 hours	s. s.	6-cyl. Sunbeam	276	2601	287M. 856 Yds.	95.83	1-10-13
4 hours	s. s.	6-cyl. Sunbeam	276	2601	380M. 628 Yds.	95.09	1-10-13
5 hours	s. s.	6-cyl. Sunbeam	276	2601	473M. 464 Yds.	94.65	1-10-13
6 hours	s. s.	6-cyl. Sunbeam	276	2601	566M. 589 Yds.	94.39	1-10-13
7 hours	s. s.	6-cyl. Sunbeam	276	2601	653M. 147 Yds.	93.29	1-10-13
8 hours	s. s.	6-cyl. Sunbeam	276	2601	748M. 247 Yds.	93.51	1-10-13
9 hours	s. s.	6-cyl. Sunbeam	276	2601	840M. 1533 Yds.	93.43	1-10-13
10 hours	s. s.	6-cyl. Sunbeam	276	2601	910M. 969 Yds.	91.06	1-10-13
11 hours	s. s.	6-cyl. Sunbeam	276	2601	989M. 828 Yds.	89.95	1-10-13
12 hours	s. s.	6-cyl. Sunbeam	276	2601	1078M. 469 Yds.	89.85	1-10-13
13 hours	s. s.	4-cyl. Argyll	159	2726	992M. 483 Yds.	76.33	27- 5-13
14 hours	s. s.	4-cyl. Argyll	159	2726	1070M. 57 Yds.	76.43	27- 5-13
15 hours	f. s.	6-cyl. Napier	....	....	1006M. 1640 Yds.	67.13	29- 6-07
16 hours	f. s.	6-cyl. Napier	....	....	1068M. 400 Yds.	66.76	29- 6-07
17 hours	f. s.	6-cyl. Napier	....	....	1139M. 1100 Yds.	67.03	29- 6-07
18 hours	f. s.	6-cyl. Napier	....	....	1203M. 830 Yds.	66.36	29- 6-07
19 hours	f. s.	6-cyl. Napier	....	....	1263M. 1170 Yds.	66.51	29 -6-07
20 hours	f. s.	6-cyl. Napier	....	....	1327M. 1190 Yds.	66.38	29- 6-07
21 hours	f. s.	6-cyl. Napier	....	....	1390M. 1100 Yds.	66.22	29- 6-07
22 hours	f. s.	6-cyl. Napier	....	....	1458M. 130 Yds.	66.27	29- 6-07
23 hours	f. s.	6-cyl. Napier	....	....	1519M. 360 Yds.	66.05	29- 6-07
24 hours	f. s.	6-cyl. Napier	....	....	1581M. 1310 Yds.	65.91	29- 6-07

Light Car Class, over 67.1 cu. in. (1100 c. c.) and under 91.5 cu. in. (1500 c. c.)

Distance or Time		Car	Piston Displacement (Cu. Inch.)	Weight Pounds	Time or Distance	Speed (M. P. H.)	Date
½ mi.	f. s.	4-cyl. A.-C.	91	1145	17.12s.	105.14	3- 6-21
1 mi.	f. s.	4-cyl.-Lagonda	91	1269	41.41s.	86.91	5-10-21
50 mi.	f. s.	4-cyl. A.-C.	91	1349	31M. 57.82s.	93.86	29-11-21
1 hour	f. s.	4-cyl. A. C.	91	1349	94M. 1227 Yds.	94.70	29-11-21
100 mi.	f. s.	4-cyl. A.-C.	91	1349	1H. 3m 18.50s.	94.77	29-11-21
3 hours	f. s.	4-cyl. Wolseley	76	1583	245M. 1501 Yds.	81.95	24-11-21
6 hours	f. s.	4-cyl. Wolseley	76	1583	490M. 393 Yds.	81.70	24-11-21
12 hours	f. s.	4-cyl. A.-C.	91	1547	736M. 1684 Yds.	61.41	13-10-21
200 mi.	s. s.	4-cyl. Talbot Darracq	90	1547	2H. 15M 6.08s.	88.82	22-10-21
500 mi.	s. s.	4-cyl. Wolseley	76	1583	6H. 6M. 46.37s.	81.79	24-11-21

Track or speedway and circular beach courses to be measured three feet from the inside pole or rail. Straightaway road race courses to be measured at the center of the road.

The Contest Board shall retain all proofs and other documents produced in respect of claims for records and shall deal with such proofs and documents as it sees fit.

The Contest Board shall keep a Register of Records.

Records shall be separated into Division One, Competitive Records; Division Two, Non-Competitive Records.

Records made on specially constructed speedways shall be known as "speedway records."

Records made in class competition on speedway, track or road shall be known as "class records" and if advertised, must state the class.

Records made in free for all competition or in events open to more than one division of Classes "B" or "C" are "records regardless of class."

No record will be allowed as a "class record" unless same is made in an event restricted to any one of the divisions of Classes "B" or "C."

Records made in individual trials against time are non-competitive records.

No record made on a circular dirt track less than one mile in length will be allowed.

79. INTERMEDIATE DISTANCES.—In any attempt to lower a record for a given distance, records can only be taken in regular rotation from the starting line.

Division One

COMPETITIVE RECORDS

SPEEDWAY RECORDS, CLASS "B" STOCK CAR
(Piston Displacement)

SPEEDWAY RECORDS, CLASS "B" STOCK CHASSIS
(Piston Displacement)

161 TO 230 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
4 miles	3:49.00	Witt	E. M. F.	Atlanta	Nov. 3, 1910
5 "	4:35.47	L. Chevrolet	Buick	Indianapolis	July 2, 1910
10 "	8:55.40	L. Chevrolet	Buick	Indianapolis	July 2, 1910
20 "	19:51.00	Knipper	Chalmers	Atlanta	Nov. 12, 1909
50 "	50:36.00	Nelson	Buick	Atlanta	Nov. 9, 1909
100 "	1:40:46.81	Knipper	Chalmers	Atlanta	Nov. 10, 1909

231 TO 300 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
5 miles	4:16.00	Dawson	Marmon	Indianapolis	July 2, 1910
10 "	8:16.08	Harroun	Marmon	Indianapolis	May 27, 1910
20 "	17:10.70	Chevrolet	Buick	Atlanta	Nov. 11, 1909
25 "	21:48.92	Harroun	Marmon	Indianapolis	May 30, 1910
50 "	42:41.33	Harroun	Marmon	Indianapolis	May 30, 1910
75 "	67:31.07	Harroun	Marmon	Atlanta	Nov. 11, 1909
100 "	1:30:08.31	Harroun	Marmon	Atlanta	Nov. 11, 1909

301 TO 450 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
5 miles	4:05.76	Kincaid	National	Indianapolis	May 27, 1910
10 "	7:55.12	Aitken	National	Indianapolis	July 2, 1910
15 "	11:48.78	Aitken	National	Indianapolis	July 1, 1910
20 "	15:57.63	Dawson	Marmon	Indianapolis	May 27, 1910
50 "	39:47.35	Dawson	Marmon	Atlanta	Nov. 3, 1910
75 "	1:00:16.34	Dawson	Marmon	Indianapolis	May 27, 1910
100 "	1:23:43.11	Kincaid	National	Indianapolis	May 27, 1910
150 "	2:05:02.17	Chevrolet	Buick	Atlanta	Nov. 9, 1909
200 "	2:46:48.47	Chevrolet	Buick	Atlanta	Nov. 9, 1909
250 "	4:38:57.40	Burman	Buick	Indianapolis	Aug. 19, 1909

451 TO 600 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
5 miles	4:01.36	Oldfield	Knox	Indianapolis	May 30, 1910
10 "	7:47.71	Robertson	Fiat	Atlanta	Nov. 11, 1909
20 "	15:57.41	De Palma	Fiat	Atlanta	May 5, 1910
50 "	42:02.98	Robertson	Fiat	Atlanta	Nov. 13, 1909
100 "	1:22:35.35	Robertson	Fiat	Atlanta	Nov. 13, 1909
150 "	2:05:00.63	Robertson	Fiat	Atlanta	Nov. 13, 1909
200 "	2:53:48.32	Disbrow	Ranier	Atlanta	Nov. 13, 1909

STRAIGHTAWAY RECORDS, CLASS "C" NON-STOCK
(Piston Displacement)

161 TO 230 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
5 miles	4:20.20	J. Nikrent	Buick	Los Angeles	April 15, 1910
10 "	8:40.17	J. Nikrent	Buick	Los Angeles	April 15, 1910
15 "	13:14.52	J. Nikrent	Buick	Los Angeles	April 9, 1910
20 "	17:37.36	J. Mikrent	Buick	Los Angeles	April 9, 1910
25 "	21:12.42	Tower	Flanders	Los Angeles	May 5, 1912
50 "	43:49.69	Endicott	Cole	Los Angeles	April 9, 1910

231 TO 300 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
1 mile	0:45.60	De Palma	Mercer	Los Angeles	May 5, 1912
2 miles	1:31.53	De Palma	Mercer	Los Angeles	May 5, 1912
3 "	2:17.17	De Palma	Mercer	Los Angeles	May 5, 1912
4 "	3:02.70	De Palma	Mercer	Los Angeles	May 5, 1912
5 "	3:47.34	De Palma	Mercer	Los Angeles	May 5, 1912
10 "	5:23.80	De Palma	Packard Special	Sheepshead Bay	Aug. 17, 1918
15 "	11:11.17	De Palma	Mercer	Los Angeles	May 5, 1912
20 "	14:56.05	De Palma	Mercer	Los Angeles	May 5, 1912
25 "	18:53.20	J. Nikrent	Case	Los Angeles	May 5, 1912
50 "	42:30.08	Siefert	Dorris	Los Angeles	April 8, 1910
75 "	1:03:54.28	Harroun	Marmon	Los Angeles	April 8, 1910
100 "	1:25:22.07	Harroun	Marmon	Los Angeles	April 8, 1910

301 TO 450 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
5 miles	3:49.36	J. Nikrent	Buick	Los Angeles	April 17, 1910
10 "	7:36.61	J. Nikrent	Buick	Los Angeles	April 17, 1910
15 "	12-04-99	Dawson	Marmon	Los Angeles	April 15, 1910
20 "	16-04-40	Harroun	Marmon	Los Angeles	April 15, 1910
25 "	20:08.69	Harroun	Marmon	Los Angeles	April 15, 1910
50 "	39:53.55	Harroun	Marmon	Los Angeles	April 15, 1910

451 TO 600 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
5 miles	3:38.61	Oldfield	Knox	Los Angeles	April 16, 1910
10 "	7:20.66	Oldfield	Knox	Los Angeles	April 16, 1910
15 "	11:32.34	Marquis	Isotta	Los Angeles	April 10, 1910
20 "	15:29.18	Marquis	Isotta	Los Angeles	April 10, 1910
25 "	19:24.92	Marquis	Isotta	Los Angeles	April 10, 1910
50 "	39:20.69	Marquis	Isotta	Los Angeles	April 10, 1910

SPEEDWAY RECORDS REGARDLESS OF CLASS, STOCK

SPEEDWAY RECORDS REGARDLESS OF CLASS, NON-STOCK

Distance	Time	Driver	Car	Place	Date
1 mile	0:40.23	De Palma	Mercedes	Des Moines	June 24, 1916
2 miles	1:09.57	Louis Chevrolet	Frontenac	Chicago	Sept. 3, 1917
2 "	1:54.81	Resta	Peugot	Des Moines	June 24, 1916
4 "	2:14.22	Louis Chevrolet	Frontenac	Chicago	Sept. 3, 1917
5 "	2:56.35	Resta	Peugot	Omaha	July 15, 1916
10 "	5:20.20	Milton	Dusenberg	Sheepshead Bay	June 14, 1919
15 "	8:18.90	De Palma	Packard Special	Chicago	Sept. 3, 1917
20 "	10:50.20	De Palma	Packard Special	Chicago	July 28, 1918
25 "	14:12.72	De Palma	Packard Special	Chicago	Sept. 3, 1917
50 "	26:23.40	De Palma	Packard	Sheepshead Bay	June 14, 1919
75 "	40:31.00	Hearne	Disteel-Duesenberg	Cotati	Aug. 14, 1921
100 "	54:05.80	Hearne	Disteel-Duesenberg	Cotati	Aug. 14, 1921
150 "	1:21:19.20	Hearne	Disteel-Duesenberg	Cotati	Aug. 14, 1921
200 "	1:55:11.05	Mulford	Hudson	Chicago	June 16, 1917
250 "	2:23:04.03	Aitken	Peugot	Sheepshead Bay	Sept. 30, 1916
300 "	2:55:32.23	Anderson	Stutz	Sheepshead Bay	Oct. 9, 1915
350 "	3:24:42.99	Anderson	Stutz	Sheepshead Bay	Oct. 9, 1915
400 "	4:04:48.98	Resta	Peugot	Chicago	June 26, 1915
450 "	4:35:05.78	Resta	Peugot	Chicago	June 26, 1915
500 "	5:07:26.00	Resta	Peugot	Chicago	June 26, 1915

ONE MILE CIRCULAR DIRT TRACK RECORDS—STOCK

ONE MILE CIRCULAR DIRT TRACK RECORDS—NON-STOCK

Distance	Time	Driver	Car	Place	Date
10 miles	7:47.24	R. De Palma	Ballot	Syracuse	Sept. 18, 1920
15 "	12:23.20	Burman	Peugot	Bakersfield	Jan. 3, 1915
20 "	16:09.97	R. De Palma	Ballot	Syracuse	Sept. 18, 1920
25 "	20:28.80	Burman	Peugot	Bakersfield	Jan. 3, 1915
50 "	40:49.68	R. De Palma	Ballot	Syracuse	Sept. 18. 1920
75 "	1:08:56.00	Burman	Peugot	Galesburg	Oct. 22, 1914
100 "	1:29:09.00	Hearne	Chevrolet Sp.	Phoenix	Nov. 8, 1919
150 "	2:30:51.00	Wishart	Mercer	Columbus	Aug. 25, 1912
200 "	3:21:48.00	Mulford	Mason Special	Columbus	July 4, 1913

STRAIGHTAWAY RECORDS, CLASS "B" STOCK CHASSIS
(Piston Displacement)

161 TO 230 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
5 miles	4:24.13	Towers	Warren–Detroit	Jacksonville	Mar. 29, 1911
10 "	9:10.52	Towers	Warren–Detroit	Jacksonville	Mar. 30, 1911

231 TO 300 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
10 miles	8-16-35	Wilson	Cole	Jacksonville	Mar. 29, 1911

301 TO 450 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
5 miles	3:56.82	Wilcox	National	Jacksonville	Mar. 30, 1911
10 "	8:03.67	Merz	National	Jacksonville	Mar. 29, 1911

STRAIGHTAWAY RECORDS, CLASS "C" NON-STOCK
(Piston Displacement)

STRAIGHTAWAY RECORDS REGARDLESS OF CLASS, STOCK

STRAIGHTAWAY RECORDS REGARDLESS OF CLASS, NON-STOCK

Distance	Time	Driver	Car	Place	Date
10 miles	5:14.40	Bruce-Brown	Benz	Daytona	Mar. 24, 1909
20 "	13:11.92	Burman	Buick Bug	Jacksonville	Mar. 30, 1911
50 "	35:52.31	Burman	Buick Bug	Jacksonville	Mar. 28, 1911
100 "	1:12:45.20	Bernin	Renault	Daytona	Mar. 6, 1908
150 "	1:55:18.00	Disbrow	Special	Jacksonville	Mar. 31, 1911
200 "	2:34:12.00	Disbrow	Special	Jacksonville	Mar. 31, 1911
250 "	3:14:55.00	Disbrow	Special	Jacksonville	Mar. 31, 1911
300 "	3:53:33.50	Disbrow	Special	Jacksonville	Mar. 31, 1911

HOUR RECORDS

SPEEDWAY REGARDLESS OF CLASS, NON-STOCK

Time	Distance	Driver	Car	Place	Date
1 hour	74 miles	Harroun	Marmon	Los Angeles	April 16, 1910
2 hours	148 "	Harroun	Marmon	Los Angeles	April 16, 1910
24 "	1491 "	Verbeck & Hirsh	Fiat	Los Angeles	April 8, 1910

ONE MILE CIRCULAR DIRT TRACK, REGARDLESS OF CLASS, STOCK CHASSIS

Time	Distance	Driver	Car	Place	Date
24 hours	1196 miles	Patschke & Mulford	Lozier	Brighton Beach	Oct. 15, 1909

ONE MILE CIRCULAR DIRT TRACK, REGARDLESS OF CLASS, NON-STOCK

Time	Distance	Driver	Car	Place	Date
24 hours	1253 miles	Poole & Patschke	Stearns	Brighton Beach	Aug. 19, 1910

STRAIGHTAWAY, REGARDLESS OF CLASS, NON-STOCK

Time	Distance	Driver	Car	Place	Date
1 hour	81.65 miles	Disbrow	Special	Jacksonville	Mar. 28, 1911

Division Two

NON-COMPETITIVE RECORDS

SPEEDWAY RECORDS, CLASS "B" STOCK CAR
(Piston Displacement)

231 TO 300 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
10 miles	7:54.40	Mulford	Hudson	Sheepshead Bay	Nov. 25, 1915
20 "	15:45.80	Mulford	Hudson	Sheepshead Bay	Nov. 25, 1915
50 "	39:30.80	Mulford	Hudson	Sheepshead Bay	Nov. 25, 1915
100 "	1:20:21.40	Mulford	Hudson	Sheepshead Bay	Nov. 25, 1915

SPEEDWAY RECORDS, CLASS "B" STOCK CHASSIS
(Piston Displacement)

160 CUBIC INCHES AND UNDER

Distance	Time	Driver	Car	Place	Date
1 mile	0:56.80	Witt	Flanders	Indianapolis	Nov. 13, 1911
5 miles	4:22.98	Witt	Flanders	Indianapolis	Nov. 13, 1911
10 "	9:27.49	Witt	Flanders	Indianapolis	Nov. 13, 1911
15 "	14:13.26	Witt	Flanders	Indianapolis	Nov. 13, 1911
20 "	19:00.87	Witt	Flanders	Indianapolis	Nov. 13, 1911

183 TO 230 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
1 mile	0:44.37	Dawson	Chalmers	Sheepshead Bay	July 28, 1917
2 miles	1:27.44	Dawson	Chalmers	Sheepshead Bay	Aug. 1, 1917
3 "	2:11.80	Dawson	Chalmers	Sheepshead Bay	July 28, 1917
4 "	2:54.61	Dawson	Chalmers	Sheepshead Bay	Aug. 1, 1917
5 "	3:39.83	Dawson	Chalmers	Sheepshead Bay	July 28, 1917
10 "	7:16.80	Dawson	Chalmers	Sheepshead Bay	Aug. 1, 1917
15 "	10:58.55	Dawson	Chalmers	Sheepshead Bay	July 28, 1917
20 "	14:30.30	Dawson	Chalmers	Sheepshead Bay	Aug. 1, 1917
25 "	18:15.67	Dawson	Chalmers	Sheepshead Bay	July 28, 1917
50 "	36:12.93	Dawson	Chalmers	Sheepshead Bay	Aug. 1, 1917
75 "	54:32.45	Dawson	Chalmers	Sheepshead Bay	July 28, 1917
100 "	1:12:10.17	Dawson	Chalmers	Sheepshead Bay	Aug. 1, 1917

300 TO 450 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
5 miles	3:15.88	Mulford	Paige	Uniontown	May 20, 1921
10 "	6:31.48	Mulford	Paige	Uniontown	May 20, 1921
15 "	9:45.96	Mulford	Paige	Uniontown	May 20, 1921
20 "	13:01.48	Mulford	Paige	Uniontown	May 20, 1921
25 "	16:37.94	Mulford	Paige	Uniontown	May 20, 1921
50 "	33:16.43	Mulford	Paige	Uniontown	May 20, 1921
75 "	50:00.80	Mulford	Paige	Uniontown	May 20, 1921
100 "	1:06:53.26	Mulford	Paige	Uniontown	May 20, 1921

SPEEDWAY RECORDS, CLASS "C" NON-STOCK
(Piston Displacement)

160 CUBIC INCHES AND UNDER

Distance	Time	Driver	Car	Place	Date
5 miles	4:26.08	Evans	Flanders	Indianapolis	Nov. 13, 1911
10 "	8:53.97	Evans	Flanders	Indianapolis	Nov. 13, 1911
15 "	13:24.00	Evans	Flanders	Indianapolis	Nov. 13, 1911
20 "	17:54.82	Evans	Flanders	Indianapolis	Nov. 13, 1911

161 TO 183 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
1 mile	0:40.42	O'Donnell	Duesenberg	Sheepshead Bay	Nov. 10, 1919
2 miles	1:20.32	O'Donnell	Duesenberg	Sheepshead Bay	Nov. 10, 1919
3 "	2:00.46	O'Donnell	Duesenberg	Sheepshead Bay	Nov. 10, 1919
4 "	2:39.33	O'Donnell	Duesenberg	Sheepshead Bay	Nov. 10, 1919
5 "	3:16.58	O'Donnell	Duesenberg	Sheepshead Bay	Nov. 10, 1919
10 "	6:14.60	Murphy	Duesenberg	Sheepshead Bay	Nov. 18 ,1919
20 "	12:26.40	Murphy	Duesenberg	Sheepshead Bay	Nov. 18, 1919
30 "	18:34.80	Murphy	Duesenberg	Sheepshead Bay	Nov. 18, 1919
40 "	24:49.40	Murphy	Duesenberg	Sheepshead Bay	Nov. 18, 1919
50 "	30:57.40	Murphy	Duesenberg	Sheepshead Bay	Nov. 18, 1919
100 "	1:01:24.20	Murphy	Duesenberg	Sheepshead Bay	Nov. 18, 1919
150 "	1:32:12.60	Murphy	Duesenberg	Sheepshead Bay	Nov. 18, 1919
200 "	2:12:08.80	Murphy	Duesenberg	Sheepshead Bay	Nov. 18, 1919
250 "	2:42:59.40	Murphy	Duesenberg	Sheepshead Bay	Nov. 18, 1919
300 "	3:15:44.00	Murphy	Duesenberg	Sheepshead Bay	Nov. 18, 1919

231 TO 300 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
1 mile	0:30.78	Milton	Duesenberg	Sheepshead Bay	Nov. 10, 1919
2 miles	1:01.40	Milton	Duesenberg	Sheepshead Bay	Nov. 10, 1919
3 "	1:31.93	Milton	Duesenberg	Sheepshead Bay	Nov. 10, 1919
4 "	2:02.37	Milton	Duesenberg	Sheepshead Bay	Nov. 10, 1919
5 "	2:32.78	Milton	Duesenberg	Sheepshead Bay	Nov. 10, 1919
10 "	5:04.78	Milton	Duesenberg	Sheepshead Bay	Nov. 10, 1919
15 "	7:39.58	Milton	Duesenberg	Sheepshead Bay	Nov. 10, 1919
20 "	10:14.18	Milton	Duesenberg	Sheepshead Bay	Nov. 10, 1919
25 "	12:55.74	Milton	Duesenberg	Sheepshead Bay	Nov. 10, 1919
30 "	15:41.60	Milton	Duesenberg	Sheepshead Bay	Nov. 24, 1919
40 "	21:02.00	Milton	Duesenberg	Sheepshead Bay	Nov. 24, 1919
50 "	26:21.80	Milton	Duesenberg	Sheepshead Bay	Nov. 24, 1919
100 "	52:41.40	Lewis	Duesenberg	Sheepshead Bay	Nov. 24, 1919
150 "	1:19:38.20	Milton	Duesenberg	Sheepshead Bay	Nov. 24, 1919
200 "	1:48:38.40	Milton	Duesenberg	Sheepshead Bay	Nov. 24, 1919
250 "	2:14:49.80	Milton	Duesenberg	Sheepshead Bay	Nov. 24, 1919
300 "	2:44:15.40	Milton	Duesenberg	Sheepshead Bay	Nov. 24, 1919

301 TO 450 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
1 mile	0:32.49	Lewis	Duesenberg	Sheepshead Bay	Nov. 10, 1919
2 miles	1:04.66	Lewis	Duesenberg	Sheepshead Bay	Nov. 10, 1919
3 "	1:37.11	Lewis	Duesenberg	Sheepshead Bay	Nov. 10, 1919
4 "	2:09.46	Lewis	Duesenberg	Sheepshead Bay	Nov. 10, 1919
5 "	2:42.23	Lewis	Duesenberg	Sheepshead Bay	Nov. 10, 1919
10 "	5:14.00	Lewis	Duesenberg	Sheepshead Bay	Nov. 18, 1919
20 "	10:31.40	Lewis	Duesenberg	Sheepshead Bay	Nov. 18, 1919
30 "	15:50.20	Lewis	Duesenberg	Sheepshead Bay	Nov. 18, 1919
40 "	21:12.20	Lewis	Duesenberg	Sheepshead Bay	Nov. 18, 1919
50 "	26:30.60	Lewis	Duesenberg	Sheepshead Bay	Nov. 18, 1919
100 "	53:25.40	Lewis	Duesenberg	Sheepshead Bay	Nov. 18, 1919

Distance	Time	Driver	Car	Place	Date
1000 miles	11:57:57.80	Basle & Phillips	Apperson	Los Angeles	Jan. 9, 1922
1500 "	18:01:42.20	Basle & Phillips	Apperson	Los Angeles	Jan.9-10,1922
2000 "	24:53:25.00	Basle & Phillips	Apperson	Los Angeles	Jan.9-10,1922

SPEEDWAY RECORDS REGARDLESS OF CLASS, STOCK

Distance	Time	Driver	Car	Place	Date
6 miles	3:57.80	De Palma	Cunningham	Sheepshead Bay	Nov. 17, 1919
8 "	5:16.60	De Palma	Cunningham	Sheepshead Bay	Nov. 17, 1919
10 "	6:35.40	De Palma	Cunningham	Sheepshead Bay	Nov. 17, 1919

SPEEDWAY RECORDS REGARDLESS OF CLASS, NON-STOCK

Distance	Time	Driver	Car	Place	Date
¼ mile	0:06.91	Rader	Packard Special	Sheepshead Bay	July 28, 1917
½ "	0:13.94	Rader	Packard Special	Sheepshead Bay	July 28, 1917
1kilo	0:17.35	Rader	Packard Special	Sheepshead Bay	July 28, 1917
1 mile	0:28.76	Rader	Packard Special	Sheepshead Bay	July 27, 1917
2 miles	0:57.81	Rader	Packard Special	Sheepshead Bay	July 27, 1917
3 "	1:26.61	Rader	Packard Special	Sheepshead Bay	July 27, 1917
4 "	1:55.74	Rader	Packard Special	Sheepshead Bay	July 27, 1917
5 "	2:24.65	Rader	Packard Special	Sheepshead Bay	July 27, 1917
10 "	4:50.88	Rader	Packard Special	Sheepshead Bay	July 27, 1917

ONE MILE CIRCULAR DIRT TRACK RECORDS—STOCK

ONE MILE CIRCULAR DIRT TRACK RECORDS—NON-STOCK

Distance	Time	Driver	Car	Place	Date
1 mile	0:45.00	Oldfield	Oldfield Special	St. Louis	Aug. 9, 1917
2 miles	1:30.40	Oldfield	Oldfield Special	St. Louis	Aug. 9, 1917
3 "	2:17.60	Oldfield	Oldfield Special	St. Louis	Aug. 9, 1917
4 "	3:05.60	Oldfield	Oldfield Special	St. Louis	Aug. 9, 1917
5 "	3:53.60	Oldfield	Oldfield Special	St. Louis	Aug. 9, 1917
10 "	7:56.20	Oldfield	Oldfield Special	St. Louis	Aug. 9, 1917
15 "	12:00.80	Oldfield	Oldfield Special	St. Louis	Aug. 9, 1917
20 "	15:52.20	Oldfield	Oldfield Special	St. Louis	Aug. 9, 1917
25 "	19:57.60	Oldfield	Oldfield Special	St. Louis	Aug. 9, 1917
50 "	40:47.60	Oldfield	Oldfield Special	St. Louis	Aug. 9, 1917

STRAIGHTAWAY RECORDS, CLASS "B" STOCK CHASSIS
(Piston Displacement)

231 TO 300 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
1 mile	0:35.11	Mulford	Hudson	Daytona	April 10, 1916

300 TO 450 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
1 kilo.	21.56	Goodspeed	Roamer	Daytona	April 22, 1921
1 mile	34.35	Goodspeed	Roamer	Daytona	April 22, 1921
2 miles	1:08.86	Goodspeed	Roamer	Daytona	April 22, 1921
3 "	1:43.69	Goodspeed	Roamer	Daytona	April 22, 1921
4 "	2:18.08	Goodspeed	Roamer	Daytona	April 22, 1921
5 "	2:53.48	Goodspeed	Roamer	Daytona	April 22, 1921

STRAIGHTAWAY RECORDS REGARDLESS OF CLASS, STOCK

STRAIGHTAWAY RECORDS, CLASS "C" NON-STOCK
(Piston Displacement)

231 TO 300 CUBIC INCHES

Distance	Time	Driver	Car	Place	Date
½ mile	0:14.86	Murphy	Meteor-Duesenberg	Daytona	April 27, 1920
1 kilo	0:18.22	Murphy	Meteor-Duesenberg	Daytona	April 27, 1920
1 mile	0:29.36	Murphy	Meteor-Duesenberg	Daytona	April 27, 1920
2 miles	0:59.81	Murphy	Meteor-Duesenberg	Daytona	April 27, 1920
3 "	1:29.33	Murphy	Meteor-Duesenberg	Daytona	April 27, 1920
4 "	1:59.24	Murphy	Meteor-Duesenberg	Daytona	April 27, 1920
5 "	2:29.14	Murphy	Meteor-Duesenberg	Daytona	April 27, 1920
10 "	5:15.00	Murphy	Meteor-Duesenberg	Daytona	April 27, 1920

STRAIGHTAWAY RECORDS REGARDLESS OF CLASS, NON-STOCK

Distance	Time	Driver	Car	Place	Date
½ mile	0:11.57	Milton	Duesenberg	Daytona	April 27, 1920
1 kilo	0:14.40	Milton	Duesenberg	Daytona	April 27, 1920
1 mile	0:23.07	Milton	Duesenberg	Daytona	April 27, 1920
2 miles	0:46.24	Milton	Duesenberg	Daytona	April 27, 1920
3 "	1:12.18	Milton	Duesenberg	Daytona	April 25, 1920
4 "	1:36.14	Milton	Duesenberg	Daytona	April 25, 1920
5 "	2:00.04	Milton	Duesenberg	Daytona	April 25, 1920
10 "	4:09.31	De Palma	Packard Special	Daytona	Feb. 16, 1919
15 "	6:48.75	De Palma	Packard Special	Daytona	Feb. 17, 1919
20 "	8:54.20	De Palma	Packard Special	Daytona	Feb. 17, 1919
			(Standing Start)		
1 mile	0:38.83	De Palma	Packard Special	Daytona	Feb. 17, 1919

HOUR RECORDS

SPEEDWAY, CLASS "C" NON-STOCK
(Piston Displacement)

161 TO 183 CUBIC INCHES

Time	Distance	Driver	Car	Place	Date
1 hour	98 miles	Murphy	Duesenberg	Sheepshead Bay	Nov. 18, 1919
2 hours	182 "	Murphy	Duesenberg	Sheepshead Bay	Nov. 18, 1919
3 "	276 "	Murphy	Duesenberg	Sheepshead Bay	Nov. 18, 1919

231 TO 300 CUBIC INCHES

Time	Distance	Driver	Car	Place	Date
1 hour	113 miles	Milton	Duesenberg	Sheepshead Bay	Nov. 25, 1919
2 hours	222 "	Milton	Duesenberg	Sheepshead Bay	Nov. 24, 1919
3 "	323 "	Milton	Duesenberg	Sheepshead Bay	Nov. 24, 1919
4 "	428 "	De Palma	Packard Special	Sheepshead Bay	Nov. 16, 1917
5 "	522 "	De Palma	Packard Special	Sheepshead Bay	Nov. 16, 1917
6 "	616 "	De Palma	Packard Special	Sheepshead Bay	Nov. 16, 1917

301 TO 450 CUBIC INCHES

Time	Distance	Driver	Car	Place	Date
12 hours	1002 miles	Basle & Phillips	Apperson	Los Angeles	Jan. 9-10, 1922
18 "	1497 "	Basle & Phillips	Apperson	Los Angeles	Jan. 9-10, 1922
24 "	1928 "	Basle & Phillips	Apperson	Los Angeles	Jan. 9-10, 1922

301 TO 450 CUBIC INCHES

Time	Distance	Driver	Car	Place	Date
1 hour	111 miles	Lewis	Duesenberg	Sheepshead Bay	Nov. 18, 1919

SPEEDWAY, CLASS "B" STOCK CHASSIS
(Piston Displacement)

161 TO 183 CUBIC INCHES

Time	Distance	Driver	Car	Place	Date
1 hour	69 miles	Lewis	Essex	Cincinnati	Dec. 4, 1919
12 hours	818 "	Lewis & Milton	Essex	Cincinnati	Dec. 4, 1919
24 "	1539 "	Lewis, Milt. & Thomp.	Essex	Cincinnati	Dec. 4-5, 1919
36 "	2329 "	Lewis, Milt. & Thomp.	Essex	Cincinnati	Dec. 11-12, 1919
48 "	2912 "	Lewis, Milt. & Thomp.	Essex	Cincinnati	Dec. 10-11-12, 1919
50 "	3037 "	Lewis, Milt. & Thomp.	Essex	Cincinnati	Dec. 10-11-12, 1919

183 TO 230 CUBIC INCHES

Time	Distance	Driver	Car	Place	Date
1 hour	83 miles	Dawson	Chalmers	Sheepshead Bay	Aug. 1-2, 1917
12 hours	957 "	Dawson	Chalmers	Sheepshead Bay	Aug. 1-2, 1917
24 "	1898 "	Dawson	Chalmers	Sheepshead Bay	Aug. 1-2, 1917

231 TO 300 CUBIC INCHES

Time	Distance	Driver	Car	Place	Date
12 hours	924 miles	Mulford	Hudson	Sheepshead Bay	May 1-2, 1916
24 "	1819 "	Mulford	Hudson	Sheepshead Bay	May 1-2, 1916

300 TO 450 CUBIC INCHES

Time	Distance	Driver	Car	Place	Date
1 hour	89 miles	Mulford	Paige	Uniontown	May 20, 1921

Frank Elliott, Outsider, Wins Two Cotati Races

100 and 50 Mile Sprints Both Taken by Driver of Leach Special

COTATI, Cal., Aug. 24—Frank Elliott, an outsider in the betting and never named as a possible winner before the contest, set a new world's record in winning the 50 mile race, and also won the 100 mile feature of the triple event program of automobile races on the Cotati speedway Sunday, Aug. 6.

Driving a Leach special, equipped with a Miller engine, California products, Elliott did the 50 miles at an average speed of 117½ miles an hour, beating Bordino's record of 116 1/5 miles an hour made in this same bowl last spring.

Elliott's time was 25 min. 49.7 sec. Tommy Milton, driving a Leach special, was second, and Eddie Hearne in a Disteel Duesenberg came third. Elliott did his fastest lap at the rate of 122 miles an hour. He won the 100 mile race in 53 minutes flat, at the rate of 113.7 miles an hour. Jimmy Murphy, picked as the probable winner, came in second. Murphy was forced into the pits in the seventeenth round of the 50 mile race and discovered that a tire had become wound into the inner disc of the wheel necessitating much time for repairs and so withdrew for the 100 mile race.

In the 100 mile event Murphy was forced into the pits in the twenty-seventh lap and never regained the time lost. Elliott never went into the pits, which played a large part in his double victory.

Simple Tests Applicable to Ignition and Lighting Circuits

The Wide Awake Electrician Stocks His Mental Tool Room With Ideas Gained In Studying the Various Electrical Systems

By A. H. PACKER

IN the articles in MOTOR AGE on the electrical systems of various cars, there have been given methods of testing the ignition system, and while each explanation is applied to some particular system, the general nature of the method given should be absorbed so that it can be used on any car.

Of the electrical systems described, only one car had a magneto, all of the others having battery ignition, and in Fig. 1 is shown a diagram which gives the circuits of a battery ignition system, although the exact appearance is not in accord with any particular make, but includes the principles of most of them.

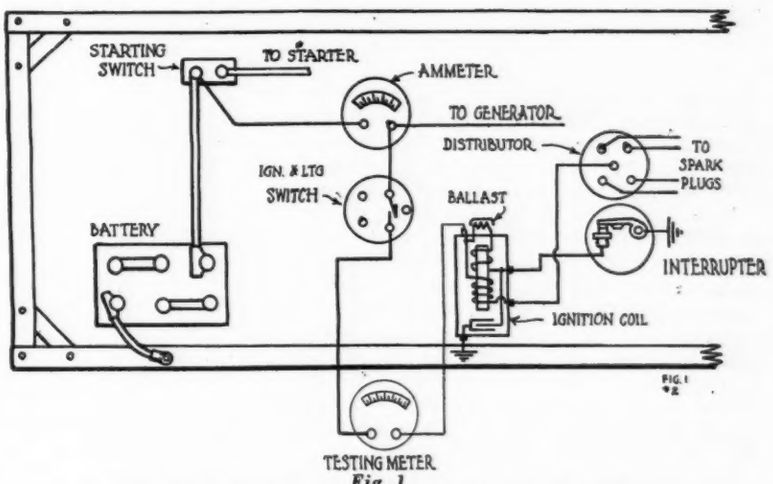


Fig. 1
Using Test Meter to Check Primary Circuit and Condenser

Here we have the current from the battery coming to the starter switch, from which a small wire connects to the ammeter. From the other ammeter terminal a wire leads to the generator and also to the ignition and lighting switch. In the diagram there is shown a testing meter and an extra wire which would not be used ordinarily. These are shown by light lines, and with these eliminated the heavy wire on the testing meter would go to the upper terminal on the coil.

When the ignition switch is turned on the current from the ammeter is allowed to flow under ordinary circumstances direct to the upper coil terminal, then through the ballast resistance on top of the coil and then through the primary or heavy winding of the ignition coil. After flowing through the primary winding, the current goes through the interrupter points to ground. The condenser in the ignition coil is so connected that it is across or in parallel with the interrupter contacts, and absorbs most of the arc at the points, so as to suddenly stop the primary current and give a high voltage in the secondary. The secondary by means of the connection through the distributor sends a spark to the proper plug whenever the interrupter points open.

The proper operation of the ignition system depends on two things. One is that the connections or circuits just described be kept unbroken, while the other is that no additional connections be made into the ignition circuits. To prevent undesirable connections we use insulation. In the ignition coil, for example, the turns of the primary are insulated from each other by enamel or cotton covering. In addition to this each layer is further insulated by a layer or two of paper.

The secondary or fine winding which generates the high voltage is also insulated between turns, usually by means of the enamel covering on the wire, and in between layers of wire, two or three layers of insulating paper are also used to keep sparks from jumping through from one layer to another.

In the case of the condenser the same thing holds true and we find the two groups of tin foil sheets insulated from each other, usually by means of paper, although mica is sometimes used.

What It Means to Shoot Ignition Trouble

In order to intelligently locate ignition trouble it is necessary to first know just where the circuit or connections should be and also where the insulation should be. Then make the necessary tests to see if there is a break in any of the connections or a failure in any of the insulation. If all is not found as you know it should be, you have found the cause of the trouble. When you have made the necessary repairs or replacement of defective parts, you will have also eliminated the trouble.

TESTING THE CIRCUITS is logically the first step, and in the average car, the ammeter on the cowl board will tell the electrician nearly the whole story if he knows its language. We will now assume that either the ammeter on the car is inaccurate, or that we do not wish to depend on it and have installed the shop ammeter as shown by the light lines in the diagram. Ignition current, if everything is O. K., will now go to the starter switch, then through the regular ammeter on the car, through the ignition switch and our test ammeter to the ignition coil.

At the ignition coil the current will go through the ballast and primary and through the interrupter points to ground or the frame of the car, through which the return circuit is completed to the battery. If on cranking the car the test ammeter shows first about 5 amperes discharge and then zero as the interrupter points close and open, it shows that the primary circuit is O. K. Rapid cranking of the engine may not allow the ammeter hand to go either up to 5 or down to zero so that in this case the correct condition of the primary circuit is indicated by an intermediate reading of about 2 amperes which may be slightly unsteady, or fluctuating.

If in the above tests there should be a steady reading of about 5 amperes on the meter, it would show that the interrupter was not opening the circuit, so that it would be well to inspect the contacts and see if they are properly adjusted. If the primary current still flows with the points open it shows either that the interrupter is grounded due to a defect in the insulation or that the wire from the coil to the interrupter is grounded, perhaps being cut by a sharp edge of the frame of the car. To determine which condition is present, the wire can

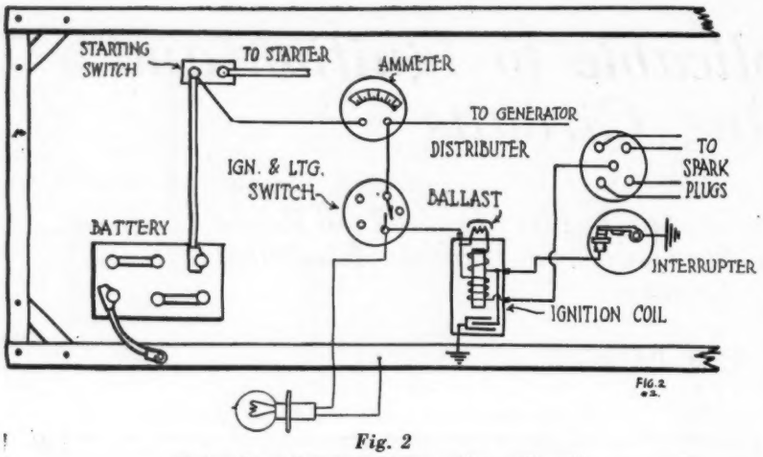


Fig. 2
Using Test Lamp to Locate Open Circuits

be removed from the interrupter after the points have been blocked open. If removing the wire allows the meter to again read zero, the fault must have been in the interrupter insulation, but if the reading on the ammeter is still five, the trouble is in the wire from the coil to the interrupter.

If in checking with the shop meter, no readings are obtained, it shows that there is a break somewhere in the primary circuit, but without testing we do not know its location, and as many of the wires are inaccessible and hard to see, we must again use some electrical test to find the open circuit. The easiest way to test for this condition is to use a six volt test lamp as shown in Fig. 2, connecting one wire from this lamp to the frame of the car and using the other lead at various places along the ignition circuit. To make this test thorough we should start at the battery, although if the starter is O. K. this test is somewhat superfluous.

The next point to test would be at the starter switch, and here the test is also more or less superfluous if the starter is working and really checks the test lamp more than anything else. From the starter switch a smaller wire runs to the ammeter, so that our next test would be at the ammeter. We will now assume that with the test lamp connected to the ammeter terminal that is wired to the starter switch that we get a light but that on the other ammeter terminal the lamp does not light up. This obviously shows an open circuit in the ammeter. However, if the test lamp lights up at both ammeter terminals, we then proceed along the ignition circuit, testing at the "Bat" terminal of the ignition and lighting switch, then at the "Ign" terminal, then at the top terminal of the ignition coil, then at the side terminal that connects to the interrupter and finally at the interrupter itself.

From the illustration above given where the trouble was assumed to be in the ammeter we come to the conclusion that THE TROUBLE WILL BE BETWEEN THE LAST PLACE WHERE THE LAMP LIGHTS UP AND THE FIRST PLACE WHERE IT FAILS TO DO SO. If the lamp should light all the way up to the interrupter it is possible that the trouble is in a burned condition of the interrupter contacts, which prevents current flowing although the contacts touch each other mechanically. The explanation of such a condition lies in the fact that the oxide that is formed on the surface of the points is an insulator, which prevents the contacts functioning as they should. The remedy is to clean up the points with a fine file, or if all of the tungsten or platinum has been worn away, the condition requires the use of new contacts.

The tests just described will check up the condition of the primary current, both in regard to the existence of possible shorts or opens, so that the next thing to check is the condenser. This device depends for its successful operation on the insulation which is put in between the layers of tin foil, and a spark jumping through this insulation will spoil the operation of the condenser and kill the sparks at the plugs. To see if the condenser is punctured is an easy matter, for the interrupter points can be blocked open with a piece of paper or a match and the ignition switch turned on and off. Ordinarily this should show no current on the ammeter, as the opening of the interrupter contacts has killed the only possible circuit. However, if the condenser is shorted or punctured it provides another path for the current to get to ground, this being through the ammeter, switch, ballast and primary of the ignition coil. The leaky or shorted condenser will then complete the circuit to ground. It therefore follows that a slight indication on the ammeter as the ignition switch is turned on shows the condenser to be defective. IT DOES NOT FOLLOW, however, that if no reading is seen that the condenser is perfect, for the leak may be so slight that it does not show up on the ammeter on the car. For this reason it is best to install a voltmeter for the test meter in Fig. 1, as such a meter is very sensitive and will show a reading when the ignition switch is turned on if the condenser is shorted but will not read if the condenser is O. K.

After it is certain that the primary circuit and the condenser are O. K., it is time to remove the distributer cap, and with the high tension lead from the coil held near the engine, operate the interrupter points by hand. With the ignition switch turned on, this should give sparks at the improvised spark gap which should easily jump 3/16 in. Failure to get good sparks on this test can be attributed to a weak coil, there being a leakage through the insulation between layers of the winding. There is no other test known than this one, which comprises testing everything else first, and then attributing to the winding insulation any difficulty that can not otherwise be located. Trying a new coil instead of the questionable one, is the next step, and if it gives satisfactory operation, no further test is needed.

Distributer Leakage

While of rare occurrence, it sometimes happens that the insulation of the distributer arm, which carries the sparks around to the different spark plugs, may develop a high tension leak, allowing the current from the coil to jump through or over this arm to the ignition unit shaft. With trouble of this kind, there would be no trouble experienced in getting a spark from the coil to jump to the engine when the interrupter is operated, but when an attempt is made to get sparks at the spark plugs, it will be found that there are none or that they are very weak. Trouble of this nature can usually be located by inspection, as the insulating material of which the arm is made, will show a burnt streak. However, the burnt part is sometimes so located that it is hard to detect by inspection and in this case an electrical test is needed.

This is available from the ignition system on the car, for the distributer cap can be left off, and the distributer arm put on the shaft. The high tension wire from the coil can now be connected directly to the metal brush on the distributer arm and the interrupter operated to produce sparks. If the arm is good, there will be either no spark due to the great jumping distance required, or the coil voltage if great enough

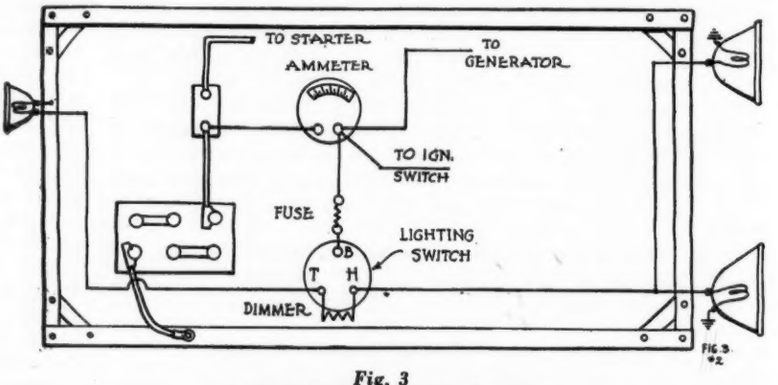


Fig. 3
Typical Simple Lighting System

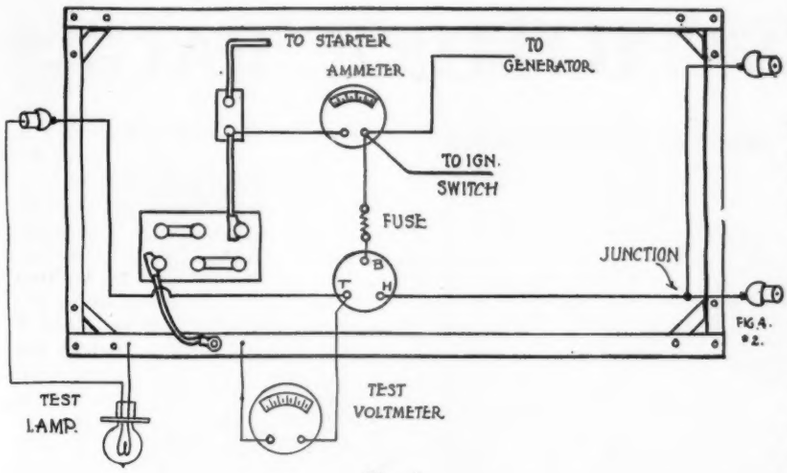


Fig. 4
Testing for Open Circuits With Voltmeter or Lamp

may cause a spark to jump down to the base of the interrupter. If the arm is defective, the path of the spark can usually be seen, lighting to incandescence the particles of carbon which have been produced by the burnt insulation.

Testing the Lighting Circuits

On most cars the general layout of the lighting circuits is about the same and in Fig. 3 we have illustrated a typical installation, in which the current from the battery goes first to the starting switch. From there a small wire goes to the ammeter and from the other ammeter terminal a wire goes to the generator. From this second ammeter terminal a wire also goes to the ignition switch. At this point a difference is noted on different cars, for some have combination ignition and lighting switches while others use separate switches. The lighting circuits on most cars have either separate fuses or a common fuse that takes care of all circuits but it is never considered advisable to run the ignition current through a fuse.

In this particular diagram we have shown a separate ignition switch, and one fuse carrying all the current for the lights, and we will consider first that the headlights work but the taillight does not. As all of the current comes through the fuse, it is evident that the fuse is not blown or the head lamps would not light up. The first possible place for the trouble is in the switch, and in Fig. 4 the test voltmeter is shown connected in such a way that it will indicate whether the circuit is O. K. through the switch or not.

In making this test it would be best to remove the dimmer coil, and instead of the voltmeter it would also be possible to use the test lamp connected in the same way. In fact the lamp would be slightly better, as burnt switch fingers might be making just sufficient contact to carry voltmeter current, but would be unable to carry current enough to operate the light. If the "T" terminal of the switch is alive as shown by a reading on the voltmeter or by the test light lighting up, the test can be followed by one made at the tail lamp plug.

If the test lamp lights up here it shows that the trouble must be in the bulb, its contact in the socket, or the contact of the plug in the socket, or the condition of the ground connection. Where a one wire system is used the tail lamp itself must be well connected to the frame of the car.

If the conditions had been reversed and the two headlights had been out instead of the taillight, then the tests would have been made at the "H" terminal of the switch instead of at the "T" terminal. A test at the plugs could also be made, but with both lamps out it is not likely that there is trouble at the bulbs or sockets as it would not ordinarily occur in both at the same time. The trouble would, however, be likely to occur in the switch or at the soldered connection at the switch or in the wire from the switch to the junction point where the current divides. If one headlamp only had been out however, it would be obvious that the trouble is from the junction point forward, being in the bulb or socket connections.

If none of the lamps will light up it is quite likely that the fuse is blown and this can usually be determined by inspecting it. However, a new fuse should not be used until the wiring has been tested to see if the ground or short that blew the fuse has been removed.

One good way to test the circuits is to connect a six volt lamp, assuming it is a six volt system, across the fuse clips in place of the fuse. Remove the dimming resistance and turn the switch to the dim position. The normal action of the switch is to connect "B" to "T" in the dim position and "B" to both "T" and "H" in the bright position, which shorts out the dimmer. In the dim position however, the tail light gets current direct but the only way the head lamps can get current is through the dimming resistance which of course reduces the head lamp brightness.

If there is no trouble in the tail lamp circuit the current will go through the test lamp, then through the switch and the tail lamp to ground, lighting up both lights dimly, or if the test lamp has a large bulb in it, the tail lamp may light and the test lamp will be out. Now assume that the dotted accidental ground marked No. 1 exists. The current will no longer have to go through the tail light but through the test light only, so that this lamp only will light up. The practical remedy is to then inspect the wire connecting the switch and taillight and see if at any place it is rubbed by the frame of the car, or other metal part, so that the wire itself is touching the frame. If so this is the location of the trouble, and the wire needs to be taped up. The tail lamp circuit will be O. K. if the test lamp fails to light, or else lights very dimly in connection with the lighting of the tail lamp.

It will be necessary to check the head lamp circuits by turning the switch to the bright position, and when doing so it will be best to disconnect the tail light wire from the switch so that the head lamp circuit only will be in use. If we assume that accidental ground No. 2 now exists, the current through the switch will light the test lamp only, but even with good circuits this condition might exist if the test lamp has a small bulb in it. For this reason it is well to remove the plugs from the head lamp sockets so that there is no chance for current to flow unless there is an accidental ground.

The general nature of the lighting circuits on the following cars is the same as the sample circuit here described, but due to the detail differences, it is obvious that the electrician must use not only diagrams of the cars being handled, but his general knowledge of circuits, as well.

The Maxwell described in the March 23, 1922, issue and the Overland in the Dec. 29, 1921, issue of MOTOR AGE will be found similar as far as the wiring is concerned.

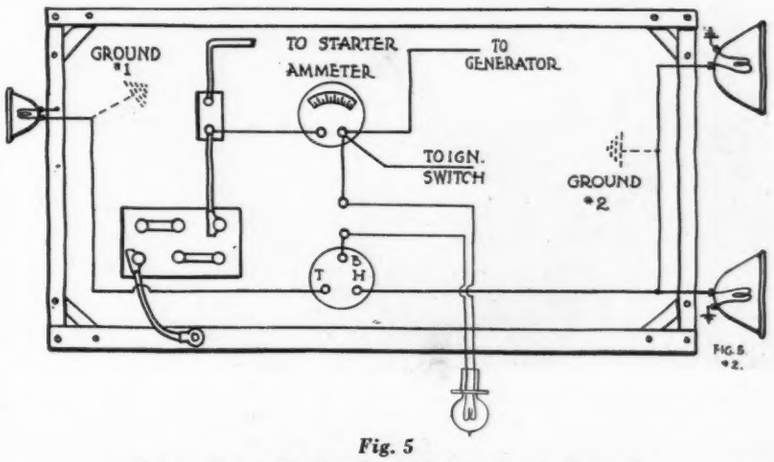
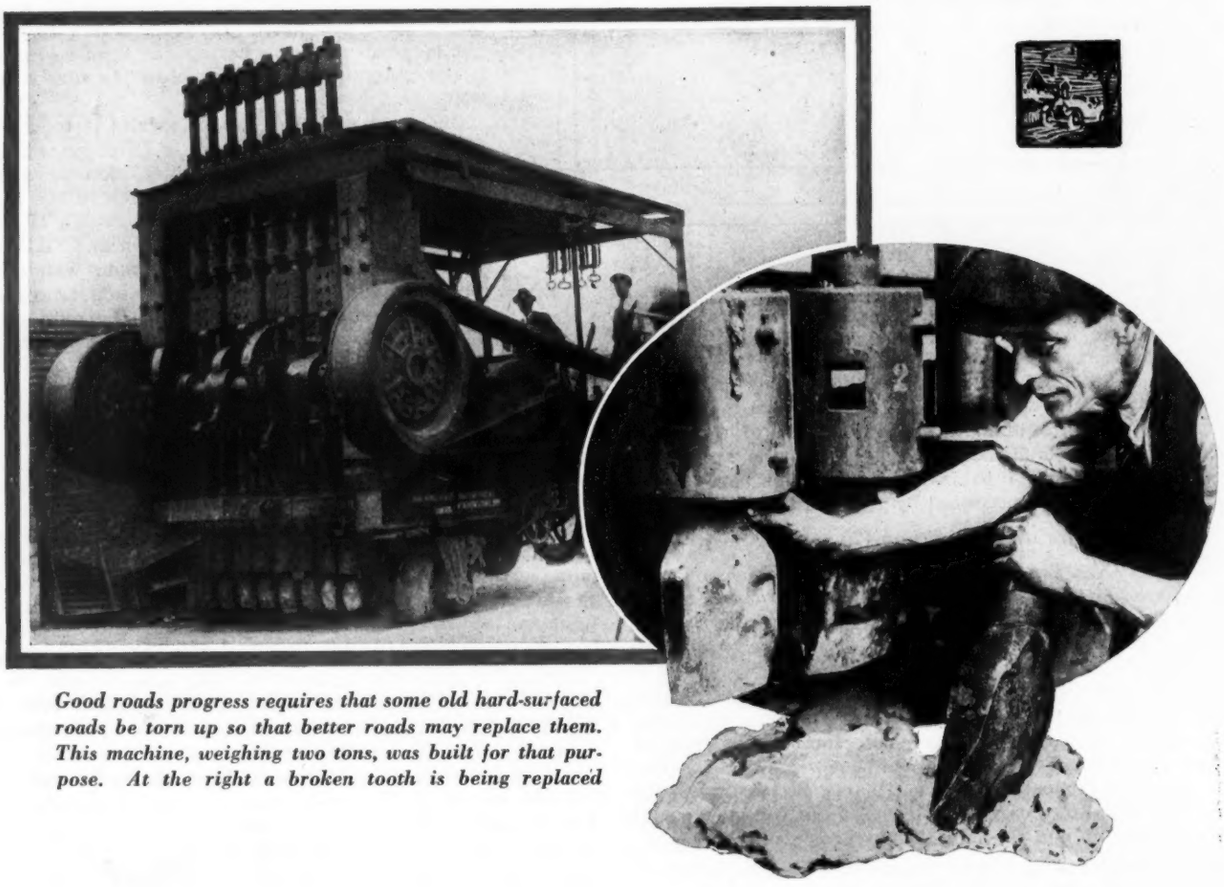


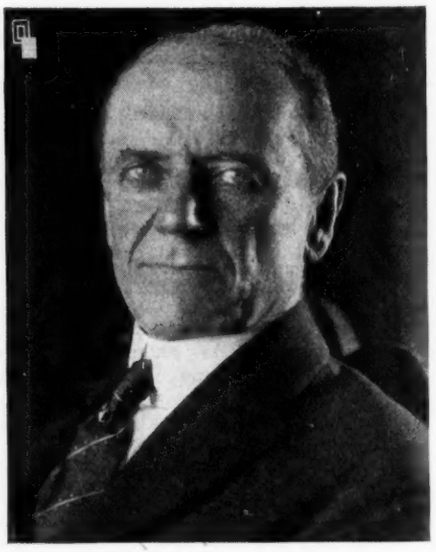
Fig. 5
Cement Lamp Used at Fust Clips to Locate Grounds

MOTOR AGE'S PICTURE PAGES



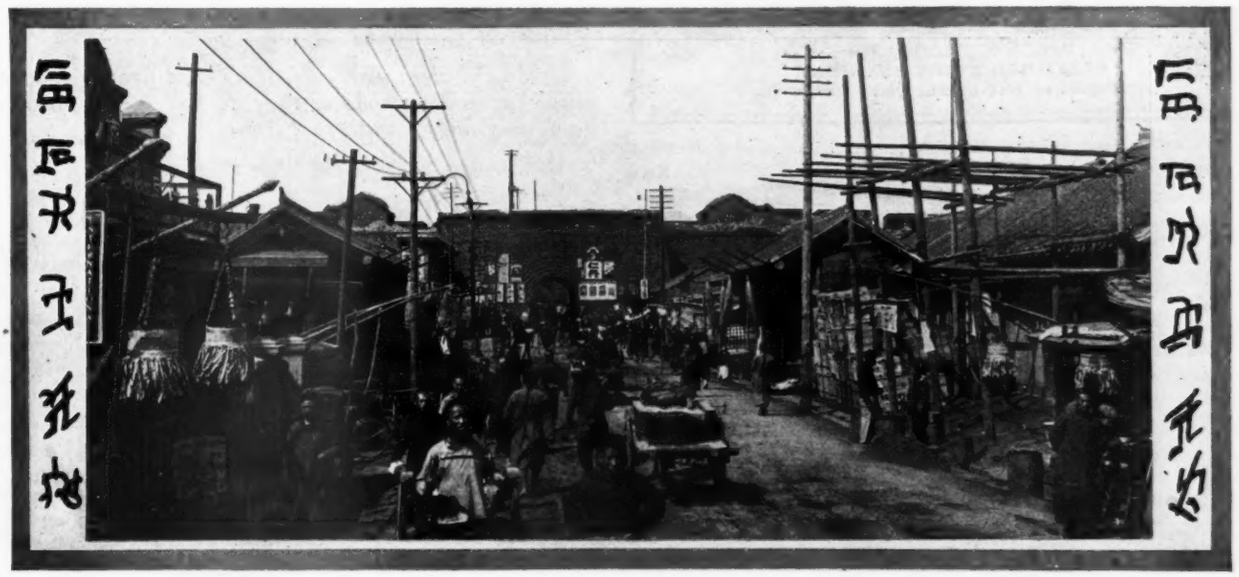
Good roads progress requires that some old hard-surfaced roads be torn up so that better roads may replace them. This machine, weighing two tons, was built for that purpose. At the right a broken tooth is being replaced

Henry Ford, whose recent adventures, according to the newspapers, included getting stuck in the mud in one of the cars he makes by the million and a $30 fine for speeding through a New York village in a car of another make, is here shown on a sight-seeing trip through the city of Quebec in an ancient vehicle. Mrs. Ford is with him



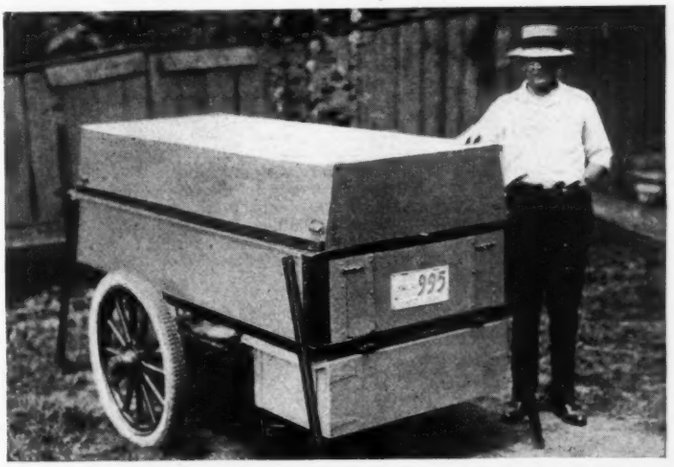
Will I. Ohmer, of Dayton, O., is head of a large merger of automobile manufacturers. He is chairman of the board of directors of the Associated Motor Industries, an $80,000,000 corporation in which nine companies are merged. This is his latest photograph

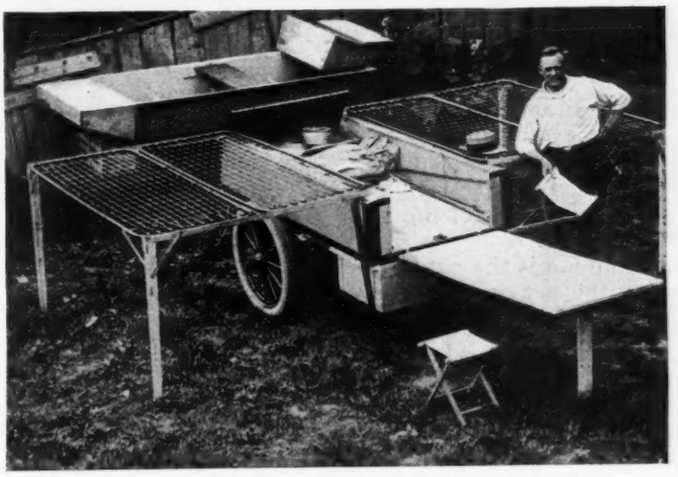
OF AUTOMOTIVE INTEREST



The Oriental traffic problem is quite different from that of the American cities where every family either owns or expects to own an automobile. This is the Broadway of Mukden, a Mongolian city in which the motor car undoubtedly will someday replace the lumbering carts which now throng the streets

Even if this Far Eastern policeman were traffic cop, he would not need his hands, for the automobile is not yet the chief means of highway transportation in the Chinese city of Peking where he walks his daily beat





Dr. Carroll Behymer of Cincinnati figured out and built this automobile trailer, which provides such luxuries as two double beds, a dining table and a boat for fishing use when camping upon the shores of a friendly lake. It weighs only 300 pounds and can be assembled in 15 minutes

MOTOR AGE

Reg. U. S. Pat. Off.
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The New Season

HARVESTS are passing, vacation season is drawing to a close, plans for fall business are ready for September, and within a very short time everything in the way of business activity will be different.

Are you, Mr. Dealer, ready?

Conditions change with the seasons in the automotive dealer establishment, just as they do in every other mercantile establishment. The same arguments are not timely to sell your goods, the problems of your customers are not the same and the goods sold change materially.

The fall is the natural time to talk strongly the closed car, the heavy truck, belt work for the tractor, to get out the chains and the electric warmers, to suggest overhaul work for the shop, to brush up your information on radiator problems and radiator repairs.

The first job, of course, is to get your merchandising stock and your equipment ready for the new season, then to start your new line of advertising, and finally to get all of your associates into line with the new thought.

Forget the idea that the automotive dealer and maintenance business is purely a seasonal business and promote in the fall the fall activities and then you will be able to keep the boys all at work and you and they will be happy over the prospects for a prosperous Christmas.

Team work and seasonable activities are necessary for prosperity.

If some dealers worked half as hard finding good points about factory methods as they do bad points, they would be doubly happy and prosperous.

The Insurance Rates

INSURANCE rates are an important item with the larger automotive dealer establishments. Today there are so many kinds of insurance that must be carried by the dealer who has a considerable maintenance department in addition to his sales activities that he is giving much attention to this department of his business.

When the National Automobile Dealers' Association adopted its new plan of organization, insurance was made a prominent feature of the program. The association proposal is that business men of a certain standard were entitled to a better rate than men of less meritorious reputation. The association began placing insurance on this basis and some remarkable savings were made to certain dealers. Then it developed that while insurance agents and brokers have no open methods of rating their risks, that automotive dealers in the same city were not paying the same rate. In fact, it was found that automotive dealers who were good shoppers among insurance agents were obtaining decided concessions.

The association plan puts all members on exactly the same basis—a rate decided by the risk experts. The insurance is placed with legitimate companies, and is not mutual. The results so far have been interesting in other ways than the saving made to N. A. D. A. members. Readers in the insurance press have noted the development there.

The first remarks about this plan were strongly condemnatory of the plan and approached the abusive stage. In time, however, this strain was dropped and recently the insurance press has been treating the N. A. D. A. plan as a business development of serious proportions. In the meantime, the N. A. D. A. continues to place insurance at a saving.

An automobile dealer objected to being classed as a store keeper, or a merchant. Evidently he hasn't the idea.

Automobiles and Health

THE health commissioner of Chicago is talking for publication on the automobile as a menace to health in the parts of the city where traffic congestion is especially marked. His comments are chiefly devoted to the exhaust smoke and noise. It is a fact that his criticisms have been very favorably received by a number of people.

This activity on the part of the health commissioner again reflects back to the dealer. Most of this criticism is founded on the carelessness of the driver, whether as to the condition of his car or his manner of handling it. We all will agree on how much of a nuisance some particular motorcycle has become in the communities where we reside, but only those who have seen a

motorcycle properly handled realize how much of this nuisance is due to the man who drives the machine.

There are certain men—less often women—who apparently value their motorcycle or automobile in the degree which they can make it a nuisance to others. They delight in blowing their horns, in use of the cut-out in racing the engine and other sports that annoy others. In fact it would appear that a great many automobile owners are working on exactly the opposite theory of the engineers—that silence of operation is desirable.

There would appear to be an opportunity for dealers and manufacturers to promote a new appreciation of the automotive vehicle by pushing the silence idea. If the owner could once get the idea that silence of operation is the point on which he is to be judged as a successful operator and his car a good one, it would radically change conditions. A dealer can promote the reputation of his car in his community by proper training of the drivers.

"Ask 'Em to Buy," "Full Service for Your Car," and "Shop Profits" are slogans that are doing much for the small dealer. Do you know their history?

Organization Spirit

THE other night a motorist stopped at a maintenance station for gasoline patches. The shop had closed and there were two men in the place at the time. One of these men was evidently an attendant and the other appeared to be merely a visitor keeping him company.

A question or two brought out the fact that the patches were kept somewhere in the tire department of the shop, but the attendant did not know just where they were kept. He stated that the man who knew would be back shortly and then, turning to the other man, asked, "Jerry, do you know where the patches are?"

Jerry, who worked in the shop at this maintenance station, said, "Yea, but I'm through for the day; let Charley get 'em. He's on tonight. When I takes me little overalls off I'm through wid this place." And so the motorist had to wait fully five minutes more until Charley arrived and dug out the patches.

Now the point is this: Jerry had not been sold on the fact that he was a salesman in that institution and that his bread and butter depended largely on the good will of that establishment. The more anxious he was to serve a customer, regardless of the time of day or the man on duty, the better he cemented the customers to the place. Jerry probably worked hard in the shop during the daytime, but he had been sold on organization spirit.

Service is the answer to the price cutter.

The Value of Hard Work

THE writer was interested recently in the comments of a housewife who had just concluded reading two pages of "Dollar Suggestions" in a household magazine. She read all of them, and there was a considerable number. Most of them were short cuts for overcoming difficulties in housekeeping. After her perusal she passed the following remark:

"Not one of those suggestions is of particular interest to me. They might have been at some time, but recently I have been schooling myself in doing my housework efficiently and in training the family to help me in little things that they can do without trouble. As a result, I find that my work is done without much trouble and the circumstances that call for short cuts are chiefiy avoided."

How well this applies to merchandising. The man who works efficiently and fundamentally needs few suggestions for freak selling plans. If he has his machine actually working day in and day out, his salesmen going over their territory and he watching such fundamental items as window display, advertising, stockkeeping and pushing seasonable goods, he will be well satisfied with the steady returns and the profits on his business.

Chiefly it is the man who does not watch closely the fundamentals and the every day operation that needs the trick sales plan and who regards it as a big thing. The "Ask 'em to Buy" movement has been a big one, because it is a fundamental that the average automotive merchant lacked. He had not told his neighbors and others that he was selling certain lines of goods. He had not advertised. In taking up this movement, he was merely doing what the grocers and others had done in a different way. There are dozens of sound ways of telling people what you have to sell and if you use these, you will not have to get into the trick or twilight zone of merchandising.

Merchandising is a real business and it has substantial rules and methods. The man who follows these will certainly meet with more success than the man who is always looking for short cuts or tricks.

Maintenance can be made to pay and should be made to pay.

Educational Needs

THERE is a crying need in this industry for someone to take the young men who are ambitious to study the automotive vehicle more seriously. Recently there has come to the attention of MOTOR AGE several lists of alleged mechanical books that are being used by city libraries as study works for the men who are ambitious to get an education that will fit them for automotive maintenance work.

Also there has come to attention a number of advertisements from schools that will equip youths to become automotive maintenance engineers in two weeks or perhaps a few days longer.

There should be a very serious effort to establish a proper educational course and some authority that can properly advise libraries and other earnest educational institutions as to the worth-while literature of the industry. It is not the fault of these young men that they are led ino misinformation, nor is it their fault that, after spending their time and money, when they apply for a job they are refused a hearing if they mention school work.

It is a sad state of affairs when the mention of school work is a mark against the youth rather than in his favor. There is much work to be done in this line. There should be some authoritative agency to recommend books and schools. If this can be done, the employers of young men will quickly change their present viewpoint as to youths who come to them from the schools.

All Ford Plants to Shut Down Sept. 16

Fuel Shortage Responsible; No Date Set for Resumption

Henry Ford Issues Statement Censuring "Wall Street Manipulators"—Won't Pay High Prices

DETROIT, Aug. 28—Declaring that Wall Street manipulators are responsible for the coal shortage, Henry Ford has ordered the closing of all his plants on Sept. 16.

He states that he will not reopen them until he can obtain coal at what he considers a fair price. Telegraphic notices have been sent to about 2,000 sources of supply to cease shipment until further notice.

A formal notice signed by Edsel Ford states: "On account of coal shortage we will be unable to operate our plants after Saturday, Sept. 16. No material will be received if shipped other than as detailed in the letter following."

It is estimated that the closing of the Ford plants will be responsible for the laying off of more than 1,000,000 workmen. There are approximately 50,000 employes at the Highland Park plant, 20,000 at the River Rouge and other Detroit plants, and 30,000 at Ford branches throughout the country.

There are 1,500 plants scattered throughout the country whose principal business is the supplying of parts and materials for Ford cars.

Henry Ford reiterated the statement this morning that he will not pay excessive prices for steel or coal. He stated that he could get coal if he were willing to pay over the market price and that he had been offered 60,000 tons at $6 a ton. He refuses to pay more than $4.50 a ton. Ford has sufficient coal on hand to operate until Sept. 16 and then to keep the factory ovens and boilers warm for an indefinite period.

Ford production has been running in excess of 5,000 cars a day. None of the other Detroit factories are affected as seriously as Ford.

When asked when the plants would resume, Ford stated that he had no idea and that the situation seemed to him impossible.

HUPP SALES UP 210 PER CENT

DETROIT, Aug. 24—Reports for the first seven months of 1922 show that Hupp Motor Car Corp. sales were 210 per cent of those for the 1921 period, with July deliveries showing an increase of 87 per cent over the same month last year. August business so far is 114 per cent greater than a year ago.

In the way of sales the books show about 19,000 cars disposed of, while the shipments for the seven months exceed those of any preceding full year. April, May and June were the best months in the company's history and for the first three months of 1922 net profits before federal taxes were paid were $383,656, equivalent after paying preferred dividends to about 75 cents a share on 519,210 shares of $10 per common stock outstanding. It is expected that the June quarter will show about $2.25 a share.

NEW PEERLESS PRICES

CLEVELAND, Aug. 28—Prices of the new Peerless models effective Aug. 24 have been announced, as follows:

4-pass. phaeton	$2990
7-pass. phaeton	2990
2-pass. coupe	3300
4-pass. coupe	3400
5-pass. sedan	3900
7-pass. sedan	4900
5-pass. Berline limousine	4390
4-pass. Brougham	4900

New Fords Have One-Man Top and Slanting Windshield

DETROIT, Aug. 26—A radical change in equipment has been made by the Ford Motor Co., which announces the adoption of the one-man top and a slanting windshield. This change already has been made and the leading Ford dealers are showing models with the new equipment.

This move, it is thought, is to forestall competition and comes as somewhat of a surprise. For years Ford has stuck to the old style top with side bows which required the services of at least two persons to put it up or close it. The elimination of the side bows will add much to the looks of the car as will the adoption of the slanting windshield. Heretofore the stock windshield has been perpendicular and of awkward appearance as compared with modern style.

No additional charge is to be made for this new equipment.

SYRACUSE SHOW FEB. 26-MARCH 3

SYRACUSE, N. Y., Aug. 28—The Syracuse Automobile Dealers' Association has selected Feb. 26-March 3 as dates for its next annual show, which, it is expected, will be held in the armory as usual. Beginning in September, the association will hold semi-monthly dealers' luncheons which were discontinued during the hot weather.

"BUSINESS IN FARMING"

CHICAGO, Aug. 25—The Power Farming Bureau, which was recently incorporated by George E. Fuller and others, has commenced publication in cooperation with the Gas Engine and Farm Power Association, of a monthly bulletin called "Business in Farming." The first number just published from the office of the Bureau at 1456 Monadnock Building, Chicago, contains 20 pages.

The bulletin contains the tentative bylaws of the Bureau which declare its purpise "to promote the use of mechanical power in agriculture."

Stutz Activities Increase Under Schwab Regime

Price Reductions Have Desirable Effect On Dealer Sales

INDIANAPOLIS, Ind., Aug. 28—Concurrent with the transfer of the control of the Stutz Motor Car Co. to the interests identified with Charles M. Schwab, head of the Bethlehem Steel Co., increased activities have been apparent in every department of the business.

The marked reduction in the prices of all models has had a desirable effect on sales and increased specifications of cars for immediate delivery have been received from dealers in all parts of the country.

Many Dealer Franchises Asked

Another notable feature of the last two weeks' activity at the Stutz plant has been the receipt of numerous requests for dealer franchises from merchants of consequence in many centers where Stutz, temporarly has been without representation. Quite a number of these applications have been approved by the factory and contracts signed.

District salesmen have been assigned territories and have set out from the Indianapolis plant to explain the future plans of the company to present Stutz distributors and dealers and others who have made application for the Stutz selling privilege.

REVISED PRODUCTION FIGURES

WASHINGTON, Aug. 26—Official figures by the Department of Commerce today give July production 223,201 passenger cars and 21,243 trucks. Revision of production figures for May and June was announced today. May production of passenger cars was 232,431. June production of passenger cars was 263,017. Revised figures on truck production for June was 25,985 trucks.

BEGIN WORK ON DOBLE FACTORY

SAN FRANCISCO, Aug. 28—Ground has been broken at Atascadero and work started on the first unit of a factory to be built for the Doble Steam Motors Corp., which will be completed in four months. The Doble company is a $10,000,000 organization to build the Doble steam car, designed by Abner Doble, who is president of the company.

RECEIVER FOR CYCLONE COMPANY

GREENVILLE, S. C., Aug. 28—The Cyclone Motors Corp., formerly known as the Cyclone Starter & Truck Co. has been placed in the hands of receivers. The local plant was devoted principally to the manufacture of Cyclone trucks, a number of which were sold in this section.

August Exceeds July in Production

A. E. A. Progresses Without Abatement During Summer

Eighty-two Additional Meetings Held In South In June and July

CHICAGO, Aug. 28—The merchandising work of the Automotive Equipment Association has progressed without abatement during the warm weather, according to records from the office of Ray W. Sherman, merchandising director. In the first 11 months of the movement more than 600 "Ask 'Em to Buy" meetings were held and there was reason to expect that activity might lessen during the summer months. On the contrary, June, July and the early part of August recorded 82 additional meetings, most of them in the Dixie section.

Ozburn, Abston & Co.'s representative, George A. Brusch, operating out of Memphis, has the largest string to his credit. Next comes the McCauley-Ward Motor Supply Co., Waco, Tex., which is working a schedule of successive days from Aug. 1 to Sept. 5.

The Peoria, Ill., jobbers, following their big meeting of 555 people on July 28, held meeting in Paxton Aug. 11 and Springfield, Aug. 21. Another is scheduled at Monmouth, Aug. 28.

The Multibestos Co. has produced a 1,000-foot reel on how to sell its brake lining, and several other manufacturers and jobbers have inserts and added reels in prospect. The Multibestos reel fits into either the "Ask 'Em to Buy" or the "Shop Profits" pictures.

Tentative arrangements have been made for meetings in the Twin Cities during the Minnesota state fair, the first week in September, in Richmond Sept. 18, and in Milwaukee, Sept. 22.

MEMPHIS TRI-STATE FAIR

MEMPHIS, Aug. 24—The 14th Annual Tri-State Fair starts at Memphis, Tenn., Sept. 23 and will last eight days. The automobile show, the automobile races, the tractor and truck exhibits on the part of Memphis tradesmen will be equal to any ever shown here. Three large new buildings, Argriculture, Administration Womans Bldg. and Entrance have been under constructilon on the grounds in in addition to the numerous structures on this old race course, once called Montgomery Park, that make it one of the finest equipped in the United States. A swimming pool, the largest in the south has also been completed recently on the grounds.

MONZA SPEEDWAY OPENED

MILAN, Italy, Aug. 25—Felice Nazzaro, driving the 122 cubic inch Fiat with which he won the recent French Grand Prix at Strasbourg, today opened Italy's first automobile speedway at Monza, six miles from Milan.

The track, which is owned by a company formed among members of the Automobile Club of Milan, measures 10 kilometres (6.2 miles) round, and which has been leased to the promoters for a period of 30 years.

De Tornaco Wins 183-In. Belgian Grand Prix

BRUSSELS, Aug. 14—(By Mail)—De Tornaco, on an Imperia-Abadal, won the 183 cubic-inch class in the Belgian Grand Prix road race, by covering 372.8 miles in 6 hrs. 44 min. 38 sec., thus averaging 55.2 miles an hour. Legache, on a French Chenard-Walcker, was the second man home in 7 hrs. 17 min. 16 sec. In the 122 cubic inch class the only car to finish out of four starters was a four cylinder Bignan, driven by Gros, who averaged 47.8 miles an hour.

As a race the Belgian Grand Prix was disappointing. The rules, which limited the number of cylinders to four, the number of valves to two per cylinder in the 122 cubic inch class, and called for four seater bodies in the 183 cubic inch class, were responsible for the small number of entries. The team of Metallurgique cars, in the 183 inch class, went out early with broken connecting rods. Derny's Imperia-Abadal had cardan joint trouble; Dauvergne broke a valve cotter on his Chenard-Walcker and for three-quarters of the distance only the winner and Lagache on Chenard-Walcker were in the race. The latter finished on three cylinders, owing to a broken valve.

The French Bignan and the Belgian Miesse were the only competitors in the 122 inch class. The Belgian cars were green and gave trouble from the beginning. The winning Bignan is a new stock job with a four cylinder engine having positively closed valves.

PULLMAN CO. EXPANDS

CHICAGO, Aug. 28—Rapid increase in its production of automobile bodies is announced by the Pullman Co. of Chicago, builders of Pullman sleeping cars and other railroad equipment. This company for a number of years has been building bodies on a limited scale for high class automobiles, but with the growth and enlargement of the business the company has created an automobile body department as an established functioning part of the organization.

The manager of the automobile body department is J. Henry Smith who announces that the company is prepared to turn out bodies in any quantity. This service includes painting and trimming and tops for the open models.

The Pullman company also has entered largely into the production of metal stampings and pressings.

Output Maintained Despite Coal Shortage and Strikes

Many New Fall Models Ready For Expected Snappy Selling Season

NEW YORK, Aug. 28—Anticipating a smart fall business, the automotive industry is not experiencing as much of a seasonal slump in production as is usually the case at this time of the year. Instead there is every indication that the August figures will show more automobiles produced in this month than during July, which was the third greatest month in a production way in the history of the industry. Returns to date from railroads, boats and driveaways show August ahead of July at this time of the month. If the pace is maintained the rest of the month, it is thought August will be within about 10 percent of June, the record holder, which turned out 288,000.

And this big production is being maintained in the face of manufacturing difficulties out of the ordinary in the way of a scarcity of both fuel and materials. The problem of the manufacturers has been to maintain adequate supplies of some materials and parts which has not been possible in the case of some of the factories, despite the employment of aggressive "parts chasing" methods.

The industry is already feeling somewhat the effects of the coal shortage. There is no accumulation of supplies. Factories generally have been able so far to avoid curtailment because of lack of power.

With the price reduction wave apparently wholly spent, the attention of the industry has been turned to new passenger car models, of which there has been a wealth since Aug. 1. Several old line companies, whose designs have been changed only slightly, if at all, have modernized both their chassis and body construction. Many manufacturers have added more models, particularly in the sport line. The fall season will open with a rich array of automotive merchandise for public inspection.

A REAL STAR SALES CHAMPION

MEMPHIS, Tenn., Aug. 24—Memphis has one premier car saleswoman, Mrs. Margaret Grigg. Without experience. the gauntlet being thrown down, she sold seven cars the first two weeks. Then it was no joke but a good occupation. Since then her sales have averaged better than fifteen cars a month. Out at the Universal Motor Car Co. authorized Ford, Lincoln and Fordson dealers, Mrs. Grigg has demonstrated the work a good lady salesman can do in the automobile profession.

Houston, Texas, Dealers Use "Pull Together" Tactics

Inaugurate Slogan Contest With Prize of $20 for Best Offering

HOUSTON, Tex., Aug. 26—If there is any one thing the Houston Automobile dealers believe in, it is close co-operation through association and efforts to put the business on the highest possible plane. During the past year the dealers in Houston have inaugurated several moves which have resulted in a "let's pull together" feeling. Right now the automotive men are working out another plan which will mean closer relations and better service.

The Houston Auto Trades Assn. has on a campaign for a slogan. The prize offered for the best slogan applicable to all dealers is $20. So far thousands of short, catchy, and pulling slogans for the members of the association have been submitted and still they come in. The campaign ends in September and it is expected the winner of the prize will be announced the latter part of that month. With the announcement of the winner the members of the Houston association will have a new slogan which they will use in the advertising, on their office stationery and in the show windows.

In Houston practically every dealer has a slogan of his own. What is wanted now is a slogan which every dealer can use. From the great number of slogans sent in it would seem certain that the word "service" will be found in the sentence or phrase finally adopted. That is one thing the members of the association want, for "service" is their middle name. The members of the association, whether, automobile dealers, tire dealers, garage men or accessory dealers are featuring service. They are guaranteeing their service and they are endeavoring to show the automobile owners that it is better to get service at a shop where the service is satisfying than to get it at a blacksmith shop where eventually it will have to be done over.

TWO MAXWELL MODELS REDUCED

DETROIT, Aug. 26—Price reductions of $150 each on the sedan and the coupe are announced by the Maxwell Motor Corp. The sedan is now $1,335 and the coupe $1,235. The open models remain unchanged. Increased production with resulting manufacturing economies is given as the basis of the reduction.

BIG ATLANTA TRACTOR SHOW

ATLANTA, Ga., Aug. 25—Officials of the Southeastern Fair to be held this fall in Atlanta advise that the tractor and power farming equipment shows to be held in connection with this year's fair will be the largest in the history of the fair. About 25 per cent more exhibitors will have space and about 30 to 35 per cent more acreage will be devoted to the displays. There will also be automotive and accessory exhibits by individual dealers and manufacturers as has been the custom the past few years, though no concerted effort will be made by the local associations in behalf of the fall show.

Saxon Motor Corporation Gets $750,000 New Capital

YPSILANTI, Mich., Aug. 26—In connection with the recent arrangement for additional capital for the Saxon Motor Car Corp. the following announcement has been made by H. L. Bill, vice president:

Stockholders of the Saxon Motor Car Corp. at a special meeting held in New York Aug. 3 approved, by vote of 160,000 shares of the 200,000 outstanding, a plan for refinancing. Under this plan the company is authorized to issue 200,000 shares of new stock which a group of New York bankers has underwritten for $750,000 in cash and $1,000,000 par value of the now outstanding preferred stock, plus accrued interest of $130,000, equivalent to $9.40 a share on Saxon Motor Stock. The company will cancel and retire the $1,000,000 prefered stock.

Under the financing program the company's capital liabilities remain unchanged, while $750,000 new money is provided for working capital to take care of increased new business. The company has canceled all contingent liabilities on parts contracted for at peak prices. The total indebtedness aggregates only $300,000.

FORD DEALERS COOPERATIVE SHOWS

ATLANTA, Ga., Aug. 25—Ford dealers in Georgia, Florida and the Carolinas are planning to hold cooperative shows during the coming month, featuring industrial power and equipment and principally the Fordson tractor. The first of these shows will be held at Jacksonville, Fla., Aug. 21 to 23; the second will be in Atlanta Aug. 29 to 31, and there will be a third at Charlotte, N. C., Sept. 6 to 8.

I. H. C. INCREASES OUTPUT

MILWAUKEE, Wis., Aug. 28—The Milwaukee works of the International Harvester Co. are operating at approximately 62 per cent of capacity, and prospects seem to be for a material increase in this rate, due to the brilliant crop outlook. The Milwaukee plant is the largest tractor works of the I. H. C. group, also making farm gas engines and cream separators. The showing as August draws to a close is the best the Milwaukee works have made in more than two and a half years.

HAYNES SALES MEETING

KOKOMO, Ind., Aug. 28—The Haynes Automobile Co. will hold a business sales meeting for the entire Haynes distributor and dealer organization at the factory on Thursday, Sept. 7, according to an announcement by Gilbert U. Radoye, director of sales and advertising for the Haynes company.

An invitation to be present at this meeting has been sent to every Haynes distributor, dealer and salesman.

Freight Car Shortage Won't Stop Automobile Deliveries

Driveaways Becoming More and More Necessary as Railroad Troubles Multiply

NEW YORK, Aug. 28—The National Automobile Chamber of Commerce is closely watching the coal priority rulings to see that the industry is placed at no undue disadvantage compared with other manufacturers.

"We have not been classified as a non-essential industry in this coal situation and we stand in the same position as other industries," says James S. Marvin, assistant general manager of the N. A. C. C. "Preference in the matter of coal is given first of all to the railroads in this crisis, for if the railroads are not operating no one can get coal in quantities. Then come hospitals and public utilities and institutions. Therefore the automobile industry is on the same plane with other industries.

"Even if the rail strike is settled soon, the automobile industry is going to be affected in the matter of deliveries this fall. Already, driveaways are becoming more and more necessary because of the increasing difficulty in getting the necessary freight cars. This may get worse before it gets better and adds to the difficulty of keeping automobile cars in this service.

"Fortunately this scarcity of transportation is not going to make us shut up shop. We have learned how to deliver cars over the road and this fall will see driveaways utilized to get the new cars into the hands of the dealers."

AMERICAN PRICES REDUCED

PLAINFIELD, N. J., Aug. 28—A new series is announced by President Carl H. Page of the American Motors Corp., which is accompanied by a guarantee on each car, against defects and materials for 25,000 miles. The new series on which deliveries already are being made include both open and enclosed models equipped with a larger engine (3½x5 in.) in addition to such special equipment as dash clock, cowl lights and ventilators, tonneau lights, windshield wiper and inside mirror.

List prices have been reduced $70 on open models and $210 on enclosed types, including extra equipment. The revised list is as follows:

	Old Price	New Price
4-pass. roadster	$1995	$1925
5-pass. phaeton	1850	1780
7-pass. phaeton	1925	1855
Sedan	2695	2485

1211 TOURISTS AT ONE CAMP

MILWAUKEE, Wis., Aug. 28—Since the city of Milwaukee established a tourist camp in Lake Park, on Lake Michigan, late in May, this year, 1211 persons from twenty-six states have made use of the facilities. The largest number in one day was 47 on Aug. 12.

Texas Men Prepare for Fall Show Season With Optimism

Prosperity of Farmers Leads Dealers to Believe Sales Will Keep Up

DALLAS, Tex., Aug. 28—With the dull days of the summer gone and the farmers marketing their crops, money is becoming more plentiful and the automobile men are turning their attention to fall campaigns which will net sales and at the same time serve to keep alive interest and business through the winter months.

Right now the automobile men of Texas are centering their efforts on fall automobile shows with the intention of making them the most impressive, appealing, complete and profitable ever held in the State. It is going to be a "dead town" which does not have an automobile show this year, one Dallas dealer and distributor said. There are more than 100 fairs scheduled in various parts of the state during the next three months and the automobile shows are going to be held in connection with these fairs. The duration of the fairs will range from three days to three weeks.

The biggest thing in the nature of an automobile show in Texas this fall will be that of the Dallas dealers during the state fair, October 6 to 16 inclusive. The Dallas dealers will have their own show house open at that time and arrangements have been made for a complete exhibit of all kinds of cars, trucks, accessories, parts and tires. A new feature this year will be an exhibit of parts made in Dallas. Dallas during the past few years has become a center for manufacturing of automobile parts. More than a million persons attend the state fair at Dallas. Dealers expect to have half of these see the exhibits in the automobile show.

Another big show which will be held this year is that of the Houston dealers, Nov. 8 to 18 inclusive. The Houston show will be the biggest thing ever staged in South Texas. Every dealer in Houston is lined up for an exhibit. At Houston the dealers have their own show house.

Fort Worth dealers will stage a show during the Fat Stock Show. This will last for one week. Every kind of car will be on exhibition there. Beaumont will put on a week show during the Southeast Texas fair. San Antonio will have a four day show.

Other towns planning automobile shows are Amarillo, Abilene, El Paso, San Angelo, Bownsville, Plainview, Wichita Falls, Tyler, Orange, Port Arthur, Galveston, Corpus Christi, Denison and Greenville.

NEW YORK TRADE PICNIC SEPT. 7

NEW YORK, Aug. 26—The "Motor Booster's Outing," the annual Broadway picnic of the New York motor trade which for the past 12 years has held the boards in September, will be held for the twelfth consecutive time at Fred J. Wagner's 180 acre farm at Smithtown, Long Island, on Thursday, Sept. 7, this year. Jim Nichols, the veteran Schebler carbureter distributor, is treasurer of this year's affair and is assisted by a committee composed of William A. Allen of the Allen Tire Case Co., Joe Hall of the Marmon; Fred Phillips of the Phillips Top Mfg. Co.; Otto Braunwarth, late Dunlop tire distributor, and Doc C. G. Percival of the Peerless Allen has charge of the athletic events and games in which valuable prizes will be awarded to the winners. Breakfast will be served from sunrise until noon, the clambake at which "Wag" and a score of helpers will labor for several days in advance will be opened at 3:30 in the afternoon and then the clams, lobsters, chickens, corn and watermelon will occupy the 700 "Boosters" until dusk. Last year over 600 motor tradesmen attended and this year's affair promises to be even better, bigger and busier.

Moves From Boston to Cleveland By Truck

BOSTON, Aug. 25—H. W. Maurer, a Bostonian who accepted a position in Cleveland which he was booked to fill Aug. 1, solved the problem of what to do with his household goods, with a railroad strike interfering with his plans, by having the entire contents of his six room apartment, including a piano loaded into a motor van and driven over the road from his home in Winthrop. The goods were loaded on Wednesday and they reached Cleveland on Saturday, so he and his family were able to move into their new home on Sunday on reaching Cleveland.

RECEIVER FOR SUPREME MOTORS

CLEVELAND, Aug. 24—N. A. Wolcott of Warren, O., has been appointed receiver of the Supreme Motors Corp. of Warren by Federal Judge D. C. Westenhaver of this city. The appointment was made on the application of the Trumbull Mfg. Co., Park Hardware Co., and Aetna Foundry Co., Warren, O., concerns which sold materials to the corporation.

HYDRO-UNITED RECEIVERS

PHILADELPHIA, Aug. 25—Receivers for the Hydro-United Tire Co. of Pottstown, Pa., have been appointed by the United States District Court of the Eastern District of Pennsylvania, which has named John P. Hall and Ephriam Lederer.

The receivers were named on a creditors' bill in equity by a Detroit advertising agency, the William N. Albee Co., with claims of about $14,000. The receivership was applied for, it is stated, for the purpose of conserving the assets of the corporation and working out its affairs for the best interests of all.

Gasoline Survey Shows That Better Fuel Is Being Sold

Much More Volatile, Says Report Issued By U. S. Bureau of Mines

WASHINGTON, Aug. 28—Results of the semi-annual motor gasoline survey, just concluded by the United States Bureau of Mines, indicate that the average gasoline sold in the country is of a better grade than has heretofore been the case. Laboratory tests of motor gasolines sold in New York, Washington, Pittsburgh, Chicago, New Orleans, St. Louis, Denver, Salt Lake City, San Francisco, and Bartlesville, Okla., during the month of July show that this year's gasoline is much more volatile than that sold two years ago, and that it has a somewhat better distillation range than last summer's samples.

Increase in volatility of gasoline means an increase in its rapidity and intensity of explosion. It means that the old bus will be easier to start on a snappy December morning. It means also that less carbon residue will be found clogging the cylinders.

A comparison of the average figures compiled by the Bureau of Mines during the past several years shows that motor gasoline is also becoming more uniform in character. The large seasonal change is disappearing, but "winter gasoline" still has a lower initial boiling point than "summer gasoline." This difference in volatility is made intentionally to facilitate starting the engine in cold weather. The end point shown in the present survey is slightly lower either than that of last winter or of the summer of 1921.

The average of the entire country considered as a whole does not show much change from a year ago, but samples from individual cities show some distinct changes. Of 132 samples collected by the Bureau of Mines in the present survey ten failed to meet Federal specifications as regards the initial boiling point of 140 degrees F., and sixty-one samples failed at the 90 per cent point (374 degrees F.)

MITCHELL IMPROVED, PRICES RAISED

RACINE, Wis., Aug. 25—Following the addition of two new body styles and a decision to increase prices because of refinements and general improvements on all models, the Mitchell Motor Car Co. has issued the following list of new prices:

	Old Price	New Price
3 Pass. roadster	$1,490	$1,750
4 Pass. sport	1,690	1,850
5 Pass. phaeton	1,490	1,750
7 Pass. phaeton	1,690	1,850
4 Pass. coupe	2,050	2,325
5 Pass. sedan	2,275	2,525
5 Pass. phaeton (complete)		1,790
5 Pass. phaeton (standard)		1,590

Wisconsin Dealers Look for Increase in Car Sales Soon

Farmer Demand Is Slowly But Surely Developing in Northern State

MILWAUKEE, Wis., Aug. 28—With the annual Wisconsin State Fair opening here today, distributors as well as dealers look for a definite increase in wholesale and retail sales, perhaps not so much in Milwaukee, but throughout the state. This event, due to the peculiar conditions obtaining at present, is expected to bring about a genuine revival in farmer demand which has been slowly but surely developing after an extended period of slackness.

Locally retail sales are increasing as prospective buyers are being acquainted more and more with the true effect of price reductions recently established, and a better consciousness aroused by merchandisers.

There are many distributors and dealers who, analyzing the situation, feel that passenger cars are now as cheap as they will be for a long time to come, despite the fact that popular opinion as usual runs toward expectancy of futher reductions whenever a cut in price is announced following a previous reduction. There is a growing feeling that the next price move will probably be upward, and in support of this opinion the trade here points to the Steel Corporation announcement during the past week of 20 per cent increase in wages. While this may not necessarily mean higher metal prices, nevertheless it does not point to lower steel prices, and since passenger car manufacturers have been passing reduced costs to customers, it would not be surprising to find this law work the other way under reversed conditions.

Pressure of railroad strike conditions and the consequent struggle to obtain cars, as well as slow movement to destination is causing more and more interest in motor trucks, especially for short haul transit. Motor truck plants here report sales in the last 30 days again considerable higher than in the previous similar period, with heavy gains over corresponding periods in 1920 and 1921.

MERCHANTS START BUS SERVICE

BIRMINGHAM, Ala., Aug. 28—The merchants and business men of Ensley, a suburb of Birmingham, have instituted a bus service from a number of small outlying towns for the purpose of increasing the trade in their section of the city, including Docena, Edgewater, Bayview and Mulga, all mining and industrial towns.

The busses will be run to and from these towns on pay days and Saturdays from 12 o'clock noon to midnight, with the exception of Docena—the cars will be operated to and from this point every day in the week. Temporary busses are being used at present, but it is planned to have specially built cars for the purpose.

"Engine" Versus "Motor"

NEW YORK, Aug. 29—The Society of Automotive Engineers has issued a bulletin calling attention to the use of the words "engine" and "motor." It is pointed out that standard nomenclature approved by the society some time ago included the use of the word "motor" as the correct name for an electric unit used for changing electric into mechanical energy, and the term "engine" as designating an internal combustion unit of the type commonly used in automobiles.

The bulletin further points out that most modern automobiles are provided with both an engine and a motor, the engine being used for propulsion and the motor for starting the engine. It is the opinion of the society that general acceptance and use in the automotive industry of the two words as defined would avoid considerable confusion.

KELSEY CAR PULLS 13½ TONS

NEWARK, N. J., Aug. 25—A practical demonstration of the efficiency of friction drive was given here when one of the new four-cylinder Kelsey chasses pulled a load of 13½ tons through the streets of this city. The load consisted of six motor cars of various makes and one truck, attached by means of ropes to the rear end of the Kelsey.

Escorted by a cordon of motorcycle police, the demonstration attracted much attention and crowds gathered to inspect the open rear end of the Kelsey chassis and the actual operation of this new type of transmission.

In the Kelsey the friction transmission comprises a straightline shaft drive, through a jackshaft and internal gears enclosed within the brake drums on the rear wheels.

MOVE TO REORGANIZE RELIANCE CO.

APPLETON, Wis., Aug. 28—Dr. D. S. Runnels of Appleton, Wis., who is understood to be representing stockholders working in reorganization plans, bid in the entire property of the Reliance Motor Truck Co. of Appleton, defunct, at trustee's sale. The bid amounted to $1 and the assumption of incumbrances totalling about $120,000. This was the only bid submitted for the entire property and probably will be accepted. Four other bids for parcels of the assets were entered. These ranged from $5000 to $8000 and were for the personal property, inventoried at $35,000. Stockholders of the defunct concern have made good headway in reorganization plans and believe they will be able to rehabilitate the industry quickly. The Reliance company manufactures motor trucks as well as motor truck axles for the truck trade. John Hackworthy is serving as trustee.

Milwaukee Factories Average Record of Earlier High Mark

Demand for Parts, Motors, Frames and Equipment Continues Unstemmed

MILWAUKEE, Wis., Aug. 28—Operations of passenger car and motor truck factories, motor, frames and parts shops, and manufacturers of automotive equipment at this time average at least equal to the high record achieved earlier in the year. A seasonal let down in July, which affected only a part of the industries, has been overcome in the last two to three weeks, with the result that by Sept. 1 it is figured production will average a substantial gain which will hold at least until the close of the year.

One of the largest malleable iron shops in Milwaukee, it is understood, has in the past week recieved rush specifications from a large passenger car builder in the middle west which require day and night operations for at least three months, with prospects of a continuation until past midwinter. This shop has been busy at capacity with a full day shift on overtime schedules for eight months or longer and has not experienced any slackening within that period.

A large manufacturer of automotive parts has added 500 men in the past thirty days. While a few shops have made no appreciable gains in number employed, there have not been any apparent losses through decline in orders.

Manufacturers of machine tools, principally milling machines, in this district report that the automotive industries continue to be their main source of new business and demands show a well sustained increase from week to week.

The passing of the coal strike trouble and resumption of shipments from lower Great Lakes ports to Milwaukee has created more optimism regarding the future, although the serious situation in the railroad labor circle remains a source of apprehension and worry. However, confidence is generally expressed that freight traffic conditions probably will not grow much worse, and even if they so do, the industries will be fairly well fortified in falling back upon motor transport which, by the same token, is very liable to experience a decided boom through such a contingency.

AUBLE TO SELL STAR IN CHICAGO

CHICAGO, Aug. 25—The Star automobile will be distributed in the Chicago district by a new company to be formed by the W. C. Auble Motor Co., 2440 South Michigan avenue. The Auble company is the distributor for the Durant cars. The new company will have a distinct name, not yet decided upon, and will distribute the Star in northern Illinois, the Iowa counties adjacent to the Mississippi river, eight counties in Indiana and one county in Wisconsin.

A. A. A. Starts Automobile Courtesy Movement for Owners

Would Emphasize Fraternal Bond of Automobile Drivers on Public Highways

WASHINGTON, Aug. 28—Cooperating with the Chicago Automobile Trade Association and the National Automobile Chamber of Commerce, the American Automobile Association is launching a campaign among its members for more courtesy between automobile drivers. The A. A. A. feels that the motorist is already over-burdened with multitudinous traffic regulations many of which it is practically impossible to avoid breaking at times. The Association feels that more courtesy among drivers of motor vehicles would tend to eliminate much of this breaking of regulations.

Careful study over a period of years has convinced officials of the A. A. A. that minor accidents are in certain instances unavoidable and it is felt that a little additional courtesy between drivers whose cars are involved in such accidents would go far toward eliminating a large percentage of friction and trouble that now follows such events.

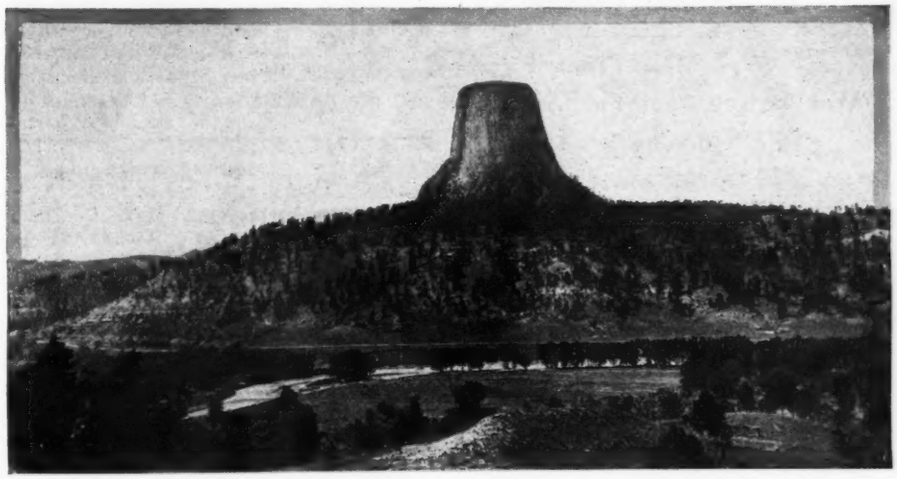
"There is a certain fraternal bond among men who drive automobiles," said Dai H. Lewis, Acting Executive Chairman of the A. A. A., "and this fraternal bond could be largely emphasized through a little additional courtesy. Accidents occur at social functions, at theaters and in fact in every place where the public meets, and courtesy and good breeding prevents the least suspicion of trouble.

"The largest public gathering in the world is that of automobile drivers on the highways of the nation and certainly the same courtesy that prevails in other walks of life should prevail here. A few softly spoken words when a minor accident does occur would often turn a potential law suit into a life time friendship for there is nothing that draws men together like a willingness to assume the blame even when one knows that he is not entirely at fault. I believe that the automobile courtesy campaign now being launched by the A. A. A. in cooperation with the Chicago Automobile Trade Association and the National Automobile Chamber of Commerce will go further toward making the roads and streets of our country safe for both motorist and pedestrian than all the laws that could possibly be evolved."

JOINS DURANT INTERESTS

CHICAGO, Aug. 26—James A. Davis, for three years manager of the Advertisers' and Investors' Protective Bureau of the Chicago Association of Commerce, has resigned to join the various Durant automobile interests as a vice-president. His work will be in connection with the financing and marketing undertakings, with special reference to the coordination of the activities of the related corporations. His headquarters will be in New York, but he will spend a good deal of his time in Chicago and in the west. As a member of the State "blue sky" commission he has been a special investigator of "blue sky" law violations for the Secretary of State of Illinois.

Why Motorists Tour



This is one of the natural scenic wonders within sight of the Custer Battlefield Highway, over which more than 8,000 automobile tourists have passed this year, expending approximately $400,000 in the towns along the route. Business men realize the benefits coming from the improvement of this highway.

Murphy Far in Lead for 1922 Racing Championship

NEW YORK, Aug. 25—No change in the standing of the leaders in the fight for the title of racing champion of 1922 resulted from the meet at Cotati, Cal., Aug. 8, except that Elliott, the Cotati winner, was advanced to fourth place in the championship table. Jimmy Murphy, with his Miller motor Leach, continues to lead the field by a big margin; in fact he is so far ahead that Harry Hartz could not catch him even though Hartz won all of the remaining championship events.

The standing of the championship is announced as follows by the American Automobile Association:

	Total Points
Murphy	2,910
Hartz	1,238
Milton	1,100
Elliott	675
Hearne	363
Sarles	280
Wonderlich	280
Bordino	270
Klein	195
Mulford	179
De Palma	160
Haibe	155
Thomas	109
Fetterman	99
Wilcox	83
Hill	50
Alley	44
De Paolo	35
Miller	28
Vail	25
Koetzla	21
Shafer	19
Morton	17
Melcher	15

$400,000 Spent by Tourists This Year Along One Highway

SHERIDAN, Wyo., Aug. 24—A real business-like understanding of the financial possibilities and benefits from an improved and connected highway over which motorists may travel with pleasure was shown at the third annual convention here of the Custer Battlefield Highway Association. Boosters of this highway attended from Iowa, South Dakota, Wyoming and Montana.

The report of W. D. Fisher, secretary of the association, showed that so far this year there has been actual registration of more than 8,000 automobiles passing over this highway, and he estimated that these tourists have expended more than $400,000 in the towns along the route. The results were considered sufficient to convince all business men, and especially automotive dealers, of the value of co-operating for the development and improvement of such highways.

The Custer Battlefield highway runs from Omaha to the northwest, reaching Glacier National Park and passing near Yellowstone Park, Custer battlefield and other scenic places. The convention adopted a resolution urging the extension of the highway from Omaha to St. Louis.

SEAMAN BODY CO. ENLARGES

MILWAUKEE, Wis., Aug. 24—The Seaman Body Corp. of Milwaukee, in which Charles W. Nash holds an important interest, has let all contracts for the erection of extensions which will increase the capacity about 100 per cent by Nov. 15 or Dec. 1. The present plant at 1732-1744 Richards Street, was erected a little over two years ago, when the old W. S. Seaman Co. of Milwaukee formed a community of interest with the Nash interests, the outgrowth of which was the Seaman Body Corp. The extension will consist of an ell-shaped four-story building, 100x423 and 325x100 ft., of concrete and brick, and will cost about $400,000, fully equipped.

8,361 Automobiles Sold In Jefferson County, Ky.

Records Show That That Figure Was Arrived At In First Seven Months

LOUISVILLE, Ky., Aug. 28—There was 8,361 automobiles sold in Jefferson County, of which Louisville is the county seat, during the first seven and one-half months of 1922, according to figures compiled by the Louisville Automobile Dealers' Association from the license records at the Court House. The exact period covered is from January 10 to August 16, the former date being the end of the relicensing for 1921 cars.

Total sales for the entire period of a little over seven months amounted to 4,494 new cars and 3,864 used cars. Of the total number of new cars sold, 8 per cent were in the high-priced class, 28 per cent in the medium-priced class and 64 per cent in the low-priced class. All cars above $2,000 are classified in the high class; those less than $2,000 and more than $750 in the medium priced class, and the balance in the low priced class.

An increase of more than 2,000 new automobiles sold during the first seven and one-half months in 1922 over new cars sold during the entire year of 1921 is shown.

GARAGE OWNERS ORGANIZE

LITTLE ROCK, Aug. 24—The Garage Owners' Association of Little Rock has been formed by garage owners, repairmen and automotive equipment dealers. The officers are: President, M. C. Bizzell; first vice-president, T. A. Shafer; second vice-president, M. M. Morrison; secretary, D. E. Winchester; treasurer, B. W. Mininger.

METZ IN BANKRUPTCY COURT

BOSTON, Aug. 25—The Metz Company, of Waltham, Mass., makers of the Metz Master Six, was petitioned into bankruptcy here yesterday by three creditors. A hearing will be granted on the petition next week. Two of the creditors brought the proceedings as a result of judgments received against the company last June, and a third has an assigned claim. The petitioners were The Johns-Manville Co., $442.19, judgment recorded June 16; The Culver-Stearns Mfg. Co., Wocrester, $67.57, judgment recovered the same date as The Johns-Manville Co., and Jacob I. Hanflig, Chelsea, on a claim assigned to him by the M. I. Hubbard Spring Co. for $108.52.

REO INCREASES WORK TIME

DETROIT, Aug. 24—The Reo Motor Car Co. will resume operations on a full five and a half day week after being on a five day operation throughout the summer. It had been the company's plan to work the short week through the warm weather period but sales have increased to such a point that it is necessary to get largely increased production. The speed wagon business, which has been steady all year, has been augmented by large increases in passenger car business following the reduction of prices and the presentation of new models.

Dealer Uses Bank Window for Display

CHICAGO, Aug. 28 — Chas. J. Dempsey, Inc., Ford dealers have tried the "friendly cooperation" thing with the Madison and Kedzie State Bank, a neighboring firm. The bank is located on a busier corner than the automobile dealer but use of one of the bank's windows was arranged for by the dealer, because, if the dealer sells more cars, he will have more money to put into the bank and then, too it makes a better impression on folks living in the neighborhood.

If the business houses are friendly toward one another, surely they will be that way with customers and that's a good feeling for customers to have. Accessories make up the display just now but room is being made to put in the 1923 Ford phaeton as soon as Dempsey receives his first consignment.

ALL-PURPOSE TRUCK FARMERS' CHOICE

ALMA, Mich., Aug. 28—Preference for the all-purpose farm body type of truck was expressed by 33 per cent of the farmers replying to a recent questionnaire sent out by the Republic Truck Sales Corporation. Twenty-five per cent expressed a preference for the box type of body, 22 per cent for the express type and 20 per cent for the rack type of body.

"Dad" Puts Town on Map With Tourist Camp Courtesy

Motorists Coming West Find Something to Talk of In Nebraska

OMAHA, Neb., Aug. 28—Tourists coming through Omaha, from the west are reporting in a proud manner the tourist camp at Valley, Neb., and they claim it is one of the best they have found.

"Dad" W. R. Nightingale, official host for Valley, is placing his town on the map with hundreds of continental tourists and picnickers.

Of small build, somewhere in the sixties, his graying Van Dyke beard carefully trimmed, "Dad" is a familiar figure on the tourist camping ground maintained by the Valley Chamber of Commerce.

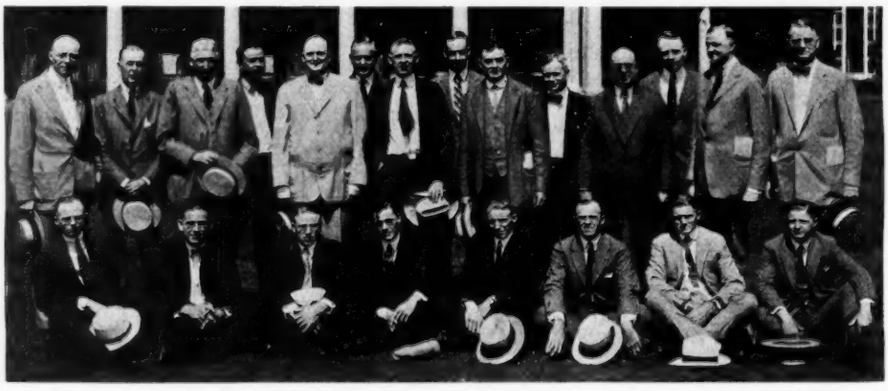
To each camper he gives a cordial welcome. "I'm Dad," he announces, offering his hand. "I'm in charge of this camp here, and we are glad to have you with us. If there is anything I can do for you, let me know."

He visits chummily, shows campers how to run the stoves, shows the large municipal wood pile, and with pride tells of his home town.

PAN HEAD MUST SERVE SENTENCE

CHICAGO, Aug. 24—The United States Circuit Court of Appeals has affirmed the sentence of 10 years in the penitentiary and a fine of $4,000 imposed on Samuel C. Pandolfo, formerly head of the Pan Motor Co., of St. Cloud, Minn., who was convicted on a charge of using the mails to defraud.

Franklin District Sales Managers Confer at Syracuse



SYRACUSE, N. Y., Aug. 26—District sales managers of the Franklin Automobile Co. met here for a four-day conference this week, with General District Manager W. H. Kemp presiding. They were photographed Monday in front of the Bellevue Country Club, where a luncheon was given for them.

In the picture, S. E. Ackerman, sales manager, may be seen at the extreme left of the back row; F. A. Barton, secretary-treasurer, is third man from the left of the picture in the back row; Louis Stellmann, chief engineer, is the fourth man at the left in the back row; Assistant Sales Manager Gaylord A. Hoyt is the fifth man in the back row from the left; Ralph Murphy, assistant to vice-president, is the tenth man from left in the back row; Advertising Manager H. H. Godhart is the first man at the left in the front row.

Tractor Folk Adopt "Ask 'Em to Buy" Policy

National Institute of Progressive Farming Prepares Propaganda

CHICAGO, Aug. 26—The "Ask 'Em to Buy" policy vigorously pushed by the Automotive Equipment Association has been adopted by the tractor folk, who hope to stimulate a year-round buying of farm machinery in this way through the medium of the countless state fairs now in progress.

Propaganda to this end has been prepared by the National Institute of Progressive Farming of Chicago, which points out that the state fairs will attract at least 20,000,000 people, mostly farmers, who can be surprised out of their non-buying lethargy by means of intelligent displays of farm machinery. Suggestions are made as to the proper methods of display, and exhibitors are urged to "say it with pigs and sheep" in driving home the fact that the farm tractor has been cut in half as to price since the pre-war days of 1913.

A most convincing argument is offered in a comparison of figures in that the price of tractors has been materially lowered while the value of hogs and lambs has gone up amazingly. "Not only has the farm tractor been cut in half as to price since 1913, but hogs are nearly 30 per cent higher than then and fat lambs more than double," says the institute. "Where we could talk the cash difference to the farmers on a tractor to start him to buy and show a 50 per cent advantage in price, not to mention a better power plant, we can translate it into hogs and show 150 per cent advantage, or into sheep and show more than 200 per cent in favor of buying a tractor now."

Talking in language the farmer can understand, it is pointed out that whereas it took 80 hogs to buy a tractor in 1913, 34 will buy it now. Before the war it required 260 sheep; now only 64 are needed. Twenty fat steers bought a tractor in 1913; now eight will. This is based on a pre-war price of $2,000 for a tractor, as against $840 now.

Exhibitors are offered suggestions as to the best method of displaying their power farm implements at the fairs. One suggestion is to place a radio on one of the tractors, and receive the daily market reports. An appeal to the farmer's wife can be made by showing a farm power plant that will give her running water, light and power for a washing machine, ironer and vacuum cleaner, which can be put in for $430, with the washing machine, ironer and vacuum cleaner added for $350 or less.

A live stock exhibit is urged to further the argument, and the exhibitor is asked to pull the machinery around by tractor power past the swine and cattle barns once or twice a day, with signs on everything to tell the story.

5,000 MOTO METER STATIONS

NEW YORK, Aug. 28—More than 5,000 authorized service stations have been appointed in four months, since the Moto Meter Co. announced a service station policy. News from the factory indicates that the number is being increased rapidly every day.

The service station policy, inaugurated to accommodate Moto Meter users, has as its object the prompt replacement of damaged Moto Meters with new instruments. Under the plan a car owner whose Moto Meter has become damaged by breakage of a part can go to any dealer operating under the service station plan, turn in the damaged instrument and get a new one for half price. The dealer is credited with the 50 per cent allowance and also with an additional service allowance.

RICHARD F. KELSEY DIES

NEW YORK, Aug. 24—Death has claimed Richard F. Kelsey, for many years a prominent figure in bicycle racing circles and at one time editor of the Automobile, now Automotive Industries. He died at his home in Montclair, N. J., as a result of a stroke of apoplexy. He was 61 years old and leaves a widow and a married daughter.

Since 1903 he had been chairman of the racing board of the National Cycling Assn., which took over the control of racing from the old league of American Wheelmen. At the time of his death he was connected with Motorcycling and Bicycling of Chicago. Originally he came from Buffalo, where he was the first president of the Buffalo Ramblers Cycling Club, one of the most powerful organizations of wheeling days.

EARL FINANCIAL STATEMENT

JACKSON, Mich., Aug. 24—Total assets of $5,984,153, including current assets of $1,557,759, against current liabilities of $793,396, are reported in the balance sheet of Earl Motors as of April 30. The total deficit is $1,439,419. There is a proposed issue of $2,775,000 5-year 6 per cent debentures and $2,285,000 7 per cent preference stock to be applied to a settlement of creditors' claims under the plan of reorganization.

NEW PATERSON PRICES

DETROIT, Aug. 26—W. A. Paterson Co., Manufacturers of the Paterson car, has reduced prices on all its models as follows:

	Old Price	New Price
Five-passenger	$1550	$1390
Seven-passenger	1585	1425
Coupe	2595	2395
Sedan	2595	2395

ARROW TO CHANGE NAME

TOLEDO, Aug. 25—The Arrow Motors Co., of Sandusky, which was incorporated to take over the assets of the defunct Maibolm Motors Co., will soon amend its articles of incorporation so as to change the name of the company to Courier Motors Co. The company will manufacture a car to sell in the $1,000 class.

Exchange of Bonds of Maxwell-Chalmers Arranged

If Plan Is Ratified, Maxwell Will Take Title to Chalmers Company

DETROIT, Aug. 25—President W. R. Wilson of Maxwell Motor Corp. and Chalmers Motor Co. announced that a basis has been arrived at between the bondholders' committee of the Chalmers company and representatives of the Maxwell company for an exchange of bonds outstanding of the Chalmers company for class A and B stock of the Maxwell corporation. If the plan is ratified by 90 per cent of the Chalmers bondholders it will become effective and Maxwell will take title to the Chalmers company.

Wilson declined to give details of the plan at this time, as he said it would be withdrawn if the consent of the required number of bondholders was not obtained. It is expected that action will be taken this week. With the consent obtained, steps would be taken at once toward refunding the Chalmers organization and placing it in a satisfactory financial position.

An outline of the production possibilities of the Chalmers company has been drafted through to next July, and with the financing plan effective, production would be started upon the scale outlined. This is considerably larger than production now, which has been held to a point which Wilson determined was consistent with its financial position. Much larger production, he said, was warranted by the demand for the car, but it was financially unable to extend its operations.

The material inventory at the plant has been practically worked off, Wilson said, and purchases are being made to meet manufacturing requirements until the future operation of the plant has been determined. The reduced prices announced this month have brought a large increase in business, which the company has been unable to meet because of its financial condition.

CAB MEN ADOPT CODE

CHICAGO, Aug. 28—At a recent convention here of the National Association of Taxicab Operators a code of ethics was adopted. The keynote of the code is fair dealing in all relations with employes, competitors and patrons. The convention was attended by about 100 taxicab operators, controlling more than 5,000 taxicabs.

SELLS USED CARS ON TRIAL

SALT LAKE CITY, Utah, Aug. 26—The Browning Automobile Company of this city, has announced its intention of selling used cars on a week's free trial. The usual contract will be made, with the exception that the purchaser will have the privilege of returning the car at the end of a week if he is not satisfied and does not wish to apply the money on another machine.

New Roamer Light Six to Be on Market in 30 Days

Five Passenger Phaeton Sedan and Touring-Sedan to Be Offered

KALAMAZOO, Mich., Aug. 25—Confirming the announcement of two weeks ago to the Kalamazoo Exchange Club of a new light six to be made by the Roamer organization but which will not be called Roamer, President A. C. Barley, states that the new models will be on the market in 30 days. At the outset the line will consist of a five passenger phaeton, a five passenger sedan and a five passenger touring sedan, and later a coupe model will probably be added.

The car will be equipped with a new type of Continental Red Seal engine. The wheelbase is to be 115 inches. Prices will be set when the first shipments are made, or about Sept. 20.

Barley also announces the development of a new taxicab. It will be regular production in the future.

Roamer models will be continued as in the past. New closed models will be on the streets in the near future. They will carry the new 12-XD Continental engine. Duesenberg engines will also be used in certain specified types of Roamers.

Barley reports that orders for the new Light Six and Roamers are coming in rapidly and that the production for next season for the local plant should be well in excess of 2,000 cars, all models included.

In connection with the manufacture of the new car, announcement is made of an issue of $300,000 first mortgage real estate gold bonds, paying 7½ per cent interest and maturing in three to ten years. Olmsted & Mulhall of Kalamazoo and Corrigan, Hilliker & Corrigan of Grand Rapids, participated in underwriting the issue. The Grand Rapids Trust Co., is trustee. This issue is guaranteed by the Roamer Motor Car Co. which has just been incorporated as successor to the Barley Motor Car Co. The capital stock consists of $500,000, seven per cent preferred stock and 1,000,000 shares of no par value common stock.

All the $500,000 preferred stock and 500,000 shares of common are in the treasury and will be available for further financing, should the business expand to such a point that it will need additional capital.

The bond issue provides for the retirement of an issue outstanding on the plant of the Kalamazoo Realty Co. and originally placed on the plant by the States Motor Car Co. which formerly owned the property.

STEPHENS NEW YORK CO.

NEW YORK, Aug. 27—The formation of the Stephens New York Motor Co. at 1853 Broadway marks a change in representation of the Stephens in the metropolitan district. An entirely new company has been formed and new quarters opened at 1853 Broadway, of which Rufus S. Cole is president. Territory awarded covers the metropolitan district, takes in all of Connecticut except Tolland, New London and Windan counties; New York state up to and including Columbia county; all of northern New Jersey and the entire foreign representation for Stephens. The company is incorporated for $100,000, with Cole the controlling factor.

Atlas and Selden Truck Combination

ROCHESTER, N. Y., Aug. 25—Combination of branches of the Atlas and Selden truck corporations is being put into effect, following the formation of the Industrial Motors Corporation in which the Selden and the Atlas companies are merged. The Hartnett-Stewart Motor Co., 1918 South State street, Chicago, representing the Selden corporation, has been taken over by the Selden corporation as a factory branch to be known as the Selden Sales & Service Co. This branch will handle sales for both the Selden and the Atlas trucks, the former being under the direction of J. Ira Hartnett and the latter under the direction of Randall H. Crouse.

The Selden and Atlas branches at Philadelphia also have combined as the Selden Sales & Service Co., handling both trucks, George H. Covert being in charge of Selden sales and H. A. Woodruff in charge of Atlas sales.

A combined branch to be known as the Selden-Atlas Sales and Service Co., has been opened at 127 South Duke street, York, Pa., the home of the Atlas company. H. M. Heiges in manager.

Other branches representing the merged companies are now in operation at New York City, New Haven, Conn.; Cleveland, O.; Charlotte, N. C.; Tulsa, Okla., and Atlanta, Ga.

JULY BIG MONTH IN OREGON

PORTLAND, Ore., Aug. 26—The month of July this year proved the greatest month in the history of Oregon in the number of new cars for which licenses were taken out during the month, according to figures made public by the Wilkins Automobile Information Service of Portland, based upon figures secured from the office of the secretary of state.

Registrations of new cars throughout the state for each month of the year thus far are: January, 482; February, 686; March, 1,352; April, 1,527; May, 1,913; June, 1,224; July, 3,559.

VAN H. CARTMELL DIES

SPRINGFIELD, O., Aug. 28—Van H. Cartmell, 72 years old, former president of the Kelly-Springfield Rubber Tire Co., died from heart disease at his home here yesterday. He had been ill two years. He became identified with the Kelly-Springfield company in 1894 as general sales agent at Boston and was elected president in 1903. He retired in 1920.

167 Fairs in Massachusetts During September and October

Dealers See Big Selling Campaign During Life of "Carnivals"

BOSTON, Aug. 25—With New England scheduled to hold 167 county and district fairs, nearly all of them during September and October, Boston motor distributors are giving attention to the possibilities of more intensive selling at these outdoor exhibitions. In the past some of the larger distributors exhibited at a few large fairs like Brockton, Marshfield and at Presque Isle, Me. Outside of these, very little attention was paid to others, leaving all that to the subdealers. Now some of the dealers in their intensive combing of the territory are writing dealers offering to co-operate with them in placing cars in the country fairs. Some may help defray part of the expenses. The potential value in New England is large, because the fair days are holidays of a kind all their own, made so by the people, who insist on taking the time off to participate. If they were not a success the number would not be increased year after year, and now at many of them special buildings have had to be constructed for motor shows, notably at Brockton, Mass., and Bangor, Me.

Maine and Connecticut are rivals for the larger number of exhibitions, with Massachusetts third. Connecticut, with 56, leads; Maine has 54 scheduled and Massachusetts 32. Vermont has 15, New Hampshire 7 and Rhode Island 3 listed. The dates start in September, right after Labor Day, and then they run continuously through the Fall. Some festivals will be in November. A large number will be held for two or three days. But some will be longer, notably the Eastern States Exposition at Springfield, Mass., that covers the entire week of seven days, beginning September 17; the Worcester fair, that will run five days; Brockton fair, four days; Charter Oak fair, Hartford, four days; Rochester and Lancaster fairs in New Hampshire, four days each; Vermont state fair, White River Junction, four days; Maine state agricultural fair, four days; Eastern Maine fair, Bangor, four days; Presque Isle, four days. Scores of others are three days each. Here are state totals:

Maine	54
New Hampshire	7
Vermont	15
Massachusetts	32
Rhode Island	3
Connecticut	56
	167

DORRIS' 17TH ANNIVERSARY

ST. LOUIS, Aug. 28—Today marks the seventeenth anniversary of the organization of the Dorris Motor Car Co., by George P. Dorris who is now president and chief engineer of the company. The first Dorris car made its maiden trip on Thanksgiving day, 1905.

BUSINESS NOTES

Charles H. Squires, Mt. Auburn, Ill., has purchased a lot with a frontage of 72 feet on South Broad street, that city, and has let the contract for a modern garage of concrete blocks which will be ready for occupancy about the first of November. Squires and his son, Virgil, will distribute automobiles, trucks and tractors and do a general service and supply business for motor vehicles.

Oak Park Franklin Motors Co. has been organized and has opened a garage at 1132 North Boulevard, Oak Park, Ill. Capital stock has been fixed at $10,000. The incorporators include Charles Renfer, W. F. Schmucker and E. T. Marquardt. The company will distribute the Franklin car and also do a general repair and service business.

Rex Motor Co. has been formed at Salem, Ill., and has opened a garage and sales agency at 206 West Main street. Capital stock has been fixed at $25,000. The promoters include H. V. Frankbener, S. P. Jones and J. M. Frankbener. The new company will handle automobiles, trucks and tractors, and also carry a line of accessories. Especial attention will be paid to power farming servicing.

Richard Berguson and Robert McGarry have formed a partnership and opened a garage at 410 Main street, Batavia, Ill. They will specialize in repair and storage business.

C. S. Gustafson and Tony Meyers, Rockford, Ill., have opened an accessory store and garage at 1312 Seventh street, and will make a specialty of battery servicing.

Charles Jones, Streator, Ill., has opened the Streator Battery station at 614 East Main street and will distribute the Vesta battery. He also plans to handle a line of motor accessories.

Harry W. Cassleman, president of the West Side Nash and Stearns Co., Chicago, who recently purchased the D. & W. Motor Sales Co., 4700 Madison st., Chicago, announces that the latter company will continue to handle the Hupmobile.

The used car department of the Authorized Ford Dealers of Chicago has been discontinued and hereafter each dealer will handle his own trades and used car transactions.

The American Wheel & Rim Co., organized at Atlanta, Ga., a few days ago with $650,000 capital, is planning the establishment of a factory before the end of the year for the manufacture of automobile wheels and rims. A rim invented by James W. Cordell, who is one of the organizers of the company, will be the principal product.

Chicago-Lexington Co., of which O. T. Mitchell is president, has opened its third branch outside of "motor row." The new store is at 4006 Washington boulevard, where both Lexington and Gardner cars will be sold.

The plant of the Monitor Motor Car Co., at Columbus, O., which has been in the hands of E. W. Pavey as receiver for more than a year, has been sold to the Clark Grave Vault Co., which will soon occupy it.

Seigfried Motor Co., Omaha, announces that they have assurances from subdealers in this territory for more than 1,700 Chevrolet cars. Business is good and the company says they disposed of a year's allotment of cars by just merely scratching over their territory. The company got a 1,500-car contract for the fical year beginning August 1, and its wholesale trade boosters only worked four days on this allotment.

The Paul Rubber Co. is a new plant at Salisbury, N. C. It manufactures casings and tubes and also has acquired the tirometer valve. R. B. Tracy, formerly with the Michelin Tire Co., has been appointed director of sales.

Frank E. Hutchinson and W. A. Aldridge have obtained the Packard agency at Logan, W. Va., and have organized the Hutchinson-Aldridge Motor Co. They are preparing to erect a two-story garage and salesroom, 40 by 150 feet, on East Stratton street, where they will handle a full line of accessories and conduct a complete maintenance shop.

Harley-Davidson Co. has appointed G. L. Clift Co. its Boston distributor, and the new dealer has opened sales and service quarters in a building just finished at 878 Commonwealth avenue. Clift handled the Harley-Davidson at Worcester since 1914.

McCarthy Bros. & Wilson, Inc., Philadelphia, have purchased the Walter E. Lanagan Ignition Co. and will combine the two businesses in the concern's new building at 2253 North Broad street, with Mr. Lanagan in charge of the battery department.

The Omaha branch of the Kelly-Springfield Tire Company has so increased its sales during the past year that it now occupies fourth place among the 30 Kelly-Springfield branches. This is shown by the latest bulletin on the $100,000 Kelly sweepstakes sales race for branch managers. According to the bulletin, Albany, San Francisco and Jacksonville are the three cities leading Omaha.

Fernald Mfg. Co., Inc., North East, Pa., announces it has taken over the business of the Clear-O-Scope Co., Angola, Ind., thus adding to the Fernald line the Clear-O-Scope windshield over-the-top type. In addition to this model the Fernald company has taken over the newly perfected Clear-O-Scope standard models, which will shortly be put on the market.

Gadsden (Ga.) Buick Co. has been incorporated here with a capital stock of $10,000. C. S. Culver, W. H. Acton, C. D. Wilkerson and C. A. Donaldson are the incorporators. Culver is president, secretary and treasurer. The company will do a general automobile business, but will handle the Buick line in particular.

Alemite Lubricator Co., Birmingham, Ala., has moved into its new home. In the construction of this building nothing has been left undone to make everything convenient for the customer.

Harding Bros., 2609 E. 75th st., will open their new garage and maintenance station on August 30. They will represent some middle-priced car in that territory of Chicago.

Hudson-Essex Co.'s new building at 2226 S. Michigan ave., Chicago, will be a $500,000 structure, 100 ft. wide by 80 ft. deep. The present service, used car and sales departments will all be housed under the new roof. The floor of the salesroom will be of marble and is said to cost $18,000 alone. D. L. Agnew, advertising manager, says that the place will be opened about Oct. 31.

Wills-Ste. Claire will soon have a new agency at 6608 Stony Island ave., Chicago.

Sherman Motor Car Corp., 51st st. and Ashland ave., Chicago, is the name of a recently opened Ford agency.

The Cunningham Co., Marquette road and Stony Island ave., Chicago, have found the automobile laundry business so profitable that the entire shop has been turned over chiefly to this branch of maintenance. An oiling and greasing service is also maintained.

A. G. Graben Motor Co., Durant dealers at Des Moines, Ia., has moved into its new building at 1436-38 Locust st.

Schedules filed this week against the Powell Auto Supply Co., Omaha, in a bankruptcy case shows liabilities of $194,338.47. Accounts payable are $100,000 and notes, $92,131. Assets include a $65,000 stock; $65,000 in accounts receivable and $25,000 equipment. Cash on hand is $1,256.

Moreland Motor Truck Co., Burbank, Cal., is offering a new issue of $1,000,000 additional stock, equally divided between common and 7 per cent cumulative participating stock, both of $10 par value, which will about double the company's capitalization.

Chase-Nash-Franklin Co., of Des Moines, Iowa, have moved into their new home at 1420-22 Locust st.

American Parts Corp., engaged in the manufacture of radiators and other attachments for motor cars, trucks and tractors, has removed the radiator department from Chicago to Toluca, Ill. The manufacturing equipment is of the automatic type. The output of radiators has reached extensive proportions.

Farm Power Co., 102 East Jefferson st., Springfield, Ill., has become distributor for the Allis-Chalmers tractor in the Sangamon county territory.

Spicer Manufacturing Corp., New York, reports net profits of $498,968 for the quarter ended June 30, 1922. After expenses and interest charges are deducted, this is equivalent after preferred dividends to $1.40 a share earned on common. Sales amounted to $2,889,221, cost of sales $2,194,321 and administrative, selling and general expenses $124,411. Preferred dividends amounted to $60,000, leaving a surplus of $438,968.

Petition in bankruptcy for the Council Bluffs (Iowa) Motor Bus Co. has been in district court by J. L. R. Lawton, president of the concern. Debts are listed at $2,051.79, with assets, including exempted claims, amounting to $2,700.

Wico Electric Co., Springfield, Mass., manufacturers of motorcycle batteries and magnetos for stationary engines, has received bids for a new building to be started Sept. 1 and completed by the beginning of 1923. It will be a one-story structure, 400x90 feet, and first of five units eventully to compose the new plant.

Stephen Associated Stores, Omaha, have opened three new tire shops in this vicinity. One is in Omaha proper, while one is in South Omaha and one in Council Bluffs, Iowa. For the opening days of the new stores, a lot of tires were sold at reduced prices.

J. S. Harrington, Inc., has opened a sales and service establishment for the Hudson and Essex in Holyoke, Mass. W. R. Parsons has been appointed branch manager.

Harry D. Sisson heads a new company formed to distribute the Durant and Star in Pittsfield (Mass.) territory, which covers Berkshire County and North Litchfield, Conn. Associated with him are Edwin L. R. Bliss as treasurer, Joseph Ward Lewis as clerk and Milton Young as sales manager. The concern has been incorporated under the name of Automotive Associates. Its salesrooms will open about Sept. 1.

Henry E. Beaumier has been appointed agent of the Ford and Lincoln in Turners Falls, Mass., and has opened a sales and service place in a building formerly occupied by Red Band Garage.

Noyes-Killy Motor Car Co., of Omaha, Neb., have taken the agency of the Franklin car.

Production for the next few weeks will be confined by the Westcott Motor Car Co., Springfield, O., to the manufacture of its new seven-passenger model. Shipments are going forward and the outlook for the fall is bright, the officers state. Cars were driven away during the past few days to Pittsburgh, Huntington, W. V., Charleston, Kalamazoo, Mich., and Chicago.

L. A. McLaughlin, of Des Moines, Ia., has purchased the accessory sales storage and service department of Bell's garage at 2315 University ave., Des Moines, and will devote all his time exclusively to the sales of Chevrolet cars.

Adams-Odell Co. has been organized and incorporated in Atlanta, and plans the establishment of a new automobile agency. Display rooms have been leased at 521 Peachtree st extending through to Courtland, and providing 15,000 square feet. Service station will also be maintained.

Tifton Buick Co., of Sylvester, Ga., has started construction of a new maintenance station and show rooms to be occupied by the company before the end of fall.

John C. McCampbell, owner of the McCampbell Sales Co., an automobile agency at Maryville, Tenn., has been elected sheriff of Blount county, Tennessee.

New Era Spring & Specialty Co., of Grand Rapids, Mich., manufacturers of "Duplex" double bar spring bumpers, announce price reduction. Hereafter the "Junior" Duplex for Ford, Chevrolet and Overland "490" will sell for $12.00 in black, instead of $14.50; and in nickel the price will be $13.50 instead of $16.50. There is no change in the price for this bumper for other small cars, which will be $14.50 in black and $16.50 for nickel as heretofore. The large "Senior" Duplex, for medium and large cars, remains at $20.00 for black and $22.00 for nickel.

Lawrence Auto Co., of Des Moines, Ia., has taken over a new location at 1124 Locust st., formerly occupied by the A. G. Graben Motor Co.

Wagner Automobile Co. of Des Moines, Ia., has secured the franchise for the Apperson distribution in 44 counties in central Iowa.

Reports on Western Conditions Are Good

DETROIT, Aug. 24—Reports on conditions brought in by executives of prominent automobile companies who have been traveling through the west are encouraging. Corn, they say, is in good condition and promises a profitable crop. When the corn money comes in the farmers will be in a better financial condition than they have been for some time, and this will help in the sale of cars. Conditions, too, are improving in Utah, where the copper smelter works were closed for some time. Now they are in operation again, giving employment to a large number of men. As an evidence of the activity in Utah, it is reported that a company has been formed to build a $25,000,000 steel plant which will use iron ore.

Utah also reports better prices on sheep and wool, while cattle are bringing higher rates, all of which means a good fall in the automobile business.

CONCERNING MEN YOU KNOW

O. P. Robb, formerly branch manager of the Omaha, Nebr., branch of the Moline Plow company, has been appointed vice-president and sales manager of the Stephens Motor Car company.

M. J. O. Rasmussen, formerly of the Herring Motor Co., of Des Moines, Ia., is now connected with the Central Auto Market of the same city.

Frank Burr Smith, works manager of the Bullard Machine Tool Co., Milford, Conn., died recently following an acute attack of appendicitis. He was in his fiftieth year and leaves a widow. Smith entered the employ of the Bullard company n 1890 as a machinist apprentice.

James A. Long, county clerk of Cass county, has purchased a half interest in the Parke Auto Co., of Rushville, Ill., and will have charge as sales maanger. As soon as the county term of office expires, he expects to devote his entire time to the automotive business. The company distributes the Overland, Chandler and Cleveland cars.

Morris Whitfield, for several years in the employ of the Oakland Motor Car Co., Pontiac, Mich., as an accountant at the Oakland plant, has been elected assistant treasurer of the company, under Thomas Mayer, comptroller.

E. R. Campbell, formerly in charge of the truck department of the Pierce-Arrow distributor in Baltimore, Md., has been appointed manager of the Springfield (Mass.) branch of the Autocar Co.

Harry Shockley, for eleven years manager of the Cincinnati Automobile Dealers' Assn., died last week. Shockley also managed the annual automobile shows held in Springer Music Hall, Cincinnati, and the speedway races formerly held at Sharonville, Ohio. Previous to becoming identified with the automobile dealers' association he was in the theatrical business.

J. Slocum O'Rourke, formerly with the Oakland Motor Car company, Pontiac, Mich., is now president of the Suburban Gas Company, with headquarters in Detroit, manufacturing a gasoline heating and lighting apparatus for suburban homes.

S. G. Gard, for fourteen years a salesman with the Deere Plow Company, Moline, Ill., has entered the firm of Taylor & Borah, 818 East Adams st., Springfield, Ill., distributors of tractors and power farming machinery.

James F. Boyd, formerly manager of the Willys-Overland branch at Spokane, Wash., has been appointed branch manager at Indianapolis to succeed G. V. Orr, who resigned to become associated with the Willys-Overland distributor in the state of Iowa.

Martin A. O'Mara, for the past two years manager of the Kansas City branch of the White Co., has been made a vice-president of the company and a member of the sales committee with headquarters at the general offices in Cleveland.

E. A. Anthony, well known in the Boston trade, has been appointed sales manager for the Brown Motors, Inc., distributors in eastern Massachusetts for the Gray car.

Homer C. Campbell, Chief Administrator of the city of Akron since Feb. 1 of this year, has resigned, effective Sept. 1, to join the Firestone Tire & Rubber Company with which he was affiliated before being named city manager. He will become assistant treasurer of the company in charge of foreign and domestic credits and will serve as chairman of the operating committee of the Coventry Land & Improvement Co., controlled by Firestone and providing homes for Firestone employes.

W. O. Rutherford, vice-president, and L. D. Brown, treasurer, of the D. F. Goodrich Co., have sailed for a six weeks' survey of business conditions in Europe. They will visit all foreign Goodrich branches, and the Goodrich factory near Paris.

O. H. Williams, export manager of the Hudson Motor Car Co., sailed for Europe last week on a trip which will take him through the British Isles, the Scandinavian countries and other countries on the continent. The trip is in connection with Hudson exports which are reported by the factory to be steadily increasing.

D. K. Parker, former assistant purchasing agent of the Grant Motor Car Corp., has been promoted to the position of purchasing agent, left vacant by the resignation of G. C. Starkweather, who has joined the Buffalo Pressed Steel Co., as assistant to the president, R. J. McKenzie.

Thomas J. Hay, president of the Chicago Automobile Trade Assn., recently addressed the Milwaukee Automobile Dealers Assn. on "Our Business."

R. Hallan recently became manager of the Chicago branch of Mack Trucks, having been transferred from the Cincinnati branch of which he was manager.

H. P. Carter, for three years manager of the Buick branch in Chicago, has been appointed district sales manager with headquarters in Chicago. His territory embraces the Chicago, Milwaukee, Battle Creek and Minneapolis branches and the Minneapolis distributors. C. F. Yonkers, sales manager of the Chicago branch for the last three years, succeeds Carter as branch manager.

G. L. Gillam, who formerly was associated with the International Harvester Co. in the sales department of the truck division, has been appointed sales manager for the Service Motor Truck Co. Rolf C. Spinning has severed connections with the company as advertising manager and has accepted a position with the Service Corp. of Troy, N. Y. His place is being filled by W. E. Murphy.

The Brunswick-Balke Collender Co. of Chicago announces the appointment of Charles B. Dunbar as district sales manager of Wisconsin with Milwaukee as headquarters.

Highway Officials of States to Meet N. A. C. C. Sept. 15-16

WASHINGTON, Aug. 25—The second meeting between the States Highway Committee and the Committee of the National Automobile Chamber of Commerce will be held in Seaview, New Jersey, Sept. 14, 15, and 16, it has been announced.

The joint committee of the N. A. C. C. and the representatives of the various state highway associations will continue the work of the first meeting in Washington this Spring when the subject of highway finances, legislation, regulations of loads and kindred topics affecting good roads, were first taken up and discussed from a national aspect.

One of the most difficult problems in the construction of good roads is their finances, the committees reported at the conclusion of the Washington conference, and some method of financing highway construction, it is anticipaped, will be evolved out of the series of conferences, which will enable states to go ahead with their good roads programs during years of depression.

TEST OF TRAFFIC WARNING FAILS

NEW YORK, Aug. 26—Efforts on the part of the American Automobile Assn. to make a test case of New York's traffic warning card ordinance have failed so far. A test case that had been arranged was called but the city withdrew the complaint, despite the protests of the A. A. A. attorneys. The city stated it preferred to test the ordinance through another case where an arrest had been made in Brooklyn, where the driver of an automobile had violated a traffic ordinance and did not have a police department warning card. The A. A. A. pointed out that such a trial would be no test of the card ordinance, as the defendant in that case would be convicted of violating another ordinance. The court had no recourse but to permit withdrawal.

Railroad Strike Situation Not a Serious Setback to Dealers

Optimism Is Everywhere, Despite Walkout, Says Hupmobile Man

DETRIOT, Aug, 26—In spite of critical aspect of the railroad strike situation, Fred B. Sides, assistant sales manager of the Hupp Motor Car Corp., on a hurried trip into Indiana and Kentucky last week, found much to encourage the automobile manufacturer and dealer.

The labor difficulty, in his opinion, is practically the only remaining obstacle in the country's march toward prosperity which was so impressively begun several months ago.

Indiana with splendid crops, according to the information he recieved from Hupmobile representatives, promises one of the best fall buying seasons in years.

In Kentucky, he was told that the tobacco crop will be exceptionally large, the demand promises to far exceed the available supply, and there is every reason to expect better prices and more prosperity for the tobacco growers.

In Louisville, he was told by one of the Southern representatives for Hupmobile that everywhere South of the Mason and Dixon Line, and East of the Mississippi, the situation is more encouraging this year than for several years past.

The confidence which the local Hupmobile men, in the territory mentioned, have in the general situation is manifested, Sides points out, by the absence of any slowing up in demand such as that which might logically be expected to follow the grave labor controversy and its ramifications of the last few weeks.

"The general attitude in the places I visited," he said, "seems much more optimistic than otherwise. The people I talked with, while admitting the seriousness of the walkout involving so many men, give one the impression that they regard it simply in the nature of a mistake and misunderstanding which will soon be corrected."

TRUCK IN 100-HOUR GRIND

KALAMAZOO, Mich., Aug. 26—On the heels of establishing a record of one minute 22½ seconds for a mile on a dirt track, the new Kalamazoo truck finished its 100-hour non-stop grind Saturday, 5 p. m.

The truck and body weighed 4,440 pounds and carried a load of 2,250 pounds, or a gross weight of 6,690 pounds for the motor to handle. The total distance covered was 1,972 miles, an average of 19.7 miles an hour. Gasoline used, 138 gallons, an average of 14.3 miles a gallon. Oil used, 14 quarts, an average of 141 miles per quart. One stop was made to replace two valve springs in the motor and four tire changes were made.

IN THE RETAIL FIELD

Thomas H. Smart, head of the Thomas H. Smart Motor Co., Memphis, Tenn., was named chairman of the arrangements committee for the Memphis Automobile show to be held at the Tri-State Fair grounds Sept. 23-30 in connection with Tri-State fair at a meeting of the directors of the Memphis Automobile Dealers' association.

Abernathy-Riddick Auto Co., Memphis, Tenn., has been organized to handle the Chevrolet and Stutz agencies. Sales rooms and service station have been opened at 336 Monroe avenue. George Abernathy, well known automobile man, is president of the company and J. Burk Riddick, Jr., is secretary and treasurer. The directorate includes J. Burk Riddick, Sr., and J. G. Bailey.

McCreery-Phelan Co., Memphis, Tenn., moved into its new home at 300-302 Monroe avenue Aug. 15. The company has the agency for Ford and Lincoln cars and Fordson tractors. The new plant is one of the most modern and attractive in the South.

Simpson Motor Sales Co., recently established in its new location, 331 East Second street, Davenport, Iowa, has added the Lexington and Gardner cars to its line.

Red Arrow Garage at Arenzville, Ill., owned by J. W. Krueger, was damaged $5,000 by fire on Aug. 12. Fire started from a truck which was unloading oil. The flames communicated to the interior of the garage. The owner plans to reopen as soon as repairs are completed.

Tony Bowman, Decatur, Ill., has purchased the garage plant at 305 South Franklin street, lately occupied by the Auburn Motor Co. This building has a frontage of 60 feet. Bowman will operate a motor car repair shop and will carry a line of accessories and supplies.

F. E. Brown, Geneseo, Ill., has commenced work upon a modern garage of one story, 90 by 135. Considerable trouble is being experienced in procuring materials, due to the railway strike, and the original date for occupancy will probably have to be extended.

The firm of Black & Maffett, Dodge Brothers distributors at Atlanta, Ga., has been dissolved, D. C. Black retiring, and F. E. Maffett taking over the business under the new name of the F. E. Maffett Motor Co. Both Black and Maffett are among the best known automobile men in the South, each having served in an executive capacity at some time or other on the state dealer association and the Atlanta dealer association. Black has been appointed Buick dealer for South Atlanta.

W. E. W. Motors Corp., 918 North Broad street, Philadelphia, Durant distributor for that territory, has been appointed to establish the Philadelphia branch of the Star Motor Co. of Pennsylvania, which will have complete charge of marketing the Star line of motor cars in that district.

Templar Motors Co., of Cleveland, has opened a new branch in Philadelphia, at Broad and Spring Garden streets. Lewis F. Johnson, at one time with the Packard Motor Car Co. of Philadelphia, is in charge as manager.

Four new sales and service stations and one authorized service station have been added to the Buick retail organization in Detroit as part of an authorized service program initiated by J. A. Coy, manager of the Detroit branch, which will establish stations in every part of the city. With the new stations there are now ten authorized stations which include eight sales agencies.

De Luxe Motor Co., is the name of a new agency at 1519 W. 63rd street, Chicago.

The Driggs car, of New Haven, Mass., was introduced to Boston today by the Mann Motors, which has the agency for the Maibohm since that car was made. It will be retailed at the same salesroom on Brighton avenue.

Dyer Co., after building on every available foot of land it owns in Cambridge, Mass., from time to time, has been forced to lease 10,000 square feet in an adjoining building to handle its orders for pistons and regrinding together with its sales of various accessory parts.

Pending the completion of their new quarter-million dollar home at 2 West Fifth South street, the Covey-Ballard Motor Co., Salt Lake City, Utah, Ford agents, have opened additional quarters to take care of their growing business. The company sold 97 new cars in June and 98 in July, in addition to their big used car business.

Rudolph Meyer, proprietor of the New York Auto Exchange, has taken over the agency for the Overland and Willys-Knight from the Willys-Overland Co., in Springfield, Mass. He will open a new sales and service building in September.

Star Motor Car Co. of Massachusetts has been formed, with headquarters in Springfield, to distribute the Star. Ward Lederer, who is also head of the Springfield Durant Co., will direct the new company's operations in that territory.

The Electric Vehicle Co., Springfield, Mass., has departed from its custom of handling only electric vehicles and has taken the agency for the Stearns-Knight. Dan A. Loomis heads the company, which will continue to sell the Rauch & Lang also. Del Flamme will have charge of the Stearns-Knight service department.

Company Formed to Study Possibility of Fokker Plan

MILWAUKEE, Wis., Aug. 25—As the next formal step in the campaign of Milwaukee manufacturers and other business men to induce A. H. G. Fokker, the famous Dutch aircraft designer and builder, to locate his proposed new American works here, the American Airway Transport Co. of Milwaukee has been incorporated in Wisconsin, with a capital stock of $100,000. This represents a fund raised by voluntary subscription by 200 business men to make a complete survey of the country, both with respect to manufacturing facilities and commercial transit possibilities. The establishment of the new American Fokker industry is to be accompanied by the organization of a great system of passenger and express transportation by air which will support the industry.

The incorporators of the Airway company are Clarence R. Falk, vice-president of the Falk Corp.; T. C. Hatton, chief engineer, Milwaukee Sewerage Commission; E. M. McMahon and Fritz Cremer, personal representative of Mr. Fokker in this country. Offices have been opened at 29 Third Street, in the Metropolitan Block, jointly with the new American office of the Netherlands Aircraft Mfg. Co.-Fokker of Amsterdam, and are in charge of Mr. Cremer. F. W. Walker is director of the survey, which will require about six months' time. On the basis of results, the proposed investment of approximately $5,000,000 is dependent. Business men throughout Wisconsin and in some of the largest cities of the country are becoming interested in the enterprise.

PHILADELPHIA COUNTY FAIR

PHILADELPHIA, Aug. 25—Visitors to the automobile and truck show of the Philadelphia county fair at Byberry, September 4-9, will doubtless learn that manufacturers have made numerous outstanding improvements in these vehicles during the last twelvemonth. New models of popular cars fresh from the factory will be presented to the public for the first time and will be a foretaste of the larger shows in the fall. Companies which have engaged space at this show are planning an educational campaign to acquaint the public with the many uses to which automobiles and trucks are being put. A tractor show also is being worked up for this, the eleventh annual county fair. Automobile races are planned for the last day of the fair—Sept. 9.

Philadelphia New Car Sales Reported "Fair"

Investigation Shows a Good Amount of Business Since Aug. 1

PHILADELPHIA, Aug. 25—Reports for the past week reaching the Philadelphia Automobile Trade Assn. headquarters show that sales of new cars are fair. Private investigation among dealers and jobbers of passenger cars also shows a fair amount of business since Aug. 1, with a few dealers claiming to be considerably ahead of last year's figures at this period.

Thus far in the month, sales of accessories have been unusually good, notwithstanding that a very large number of cars has been withdrawn from the immediate territory through the absence of their owners at mountain and seaside resorts and in prolonged tours. Some distributors of accessories state that July business was far ahead of the corresponding month a year ago and that it looks as if August sales might be in the same class. A good start has been made and the outlook for fall trade is regarded as particularly promising. Customers who have been holding back for some time will be compelled to make purchases in a month or so, if they wish to run their cars, reference to accounts seems to indicate in large percentage of cases.

The used passenger car business has slumped in the last month and a half, until there is little or nothing doing in that line at present, either in the traded-in cars at the agencies, or among the houses along North Broad street and elsewhere that make a specialty of handling this stock.

Business in the trailer field is quiet, the tractor trade, which took a small spurt following the recent Fordson show here, is again dull, and the truck business, which for a few weeks gave promise, because of some large sales of units for fleets, appears to have subsided. The trade in tires is nothing to brag about.

TIMKEN STOCK OFFERED TO PUBLIC

NEW YORK, Aug. 26—For the first time in the history of the Timken Roller Bearing Co. the public is given an opportunity to buy into its ownership. Members of the Timken family, now sole owners of the corporation, have decided to sell one-third of their holdings and 400,000 shares of stock of no par value are offered at $30 each. Hornblower & Weeks, New York brokers, are directing the sale of the stock, aggregating $1,200,000.

The sale has no elements of refinancing for the Timken company. It is stated by officials that the corporation has ample working capital and that the proceeds of the stock sale will not go to the company.

There will be no additional members of the board of directors and no change in policy or management.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Ignition Coil Explodes; the Stuff Has Some Kick These Days

Q—Recently we have been working on a 1920 Maxwell car. This car was driven into our garage one night by the owner apparently in fair running condition. Next morning when we went for the car it would not start and when the hood was lifted it was found that the ignition coil had exploded. It had apparently blown to pieces and there seemed to be a million feet of wire wrapped around the horn, bolts, spark plugs or anything of this nature that projected.

The coil in appearance was somewhat similar to a tree or plant with bunches of fine wire growing out of it. The ignition and lights were shut off. We would like to be enlightened as to the possible cause of this trouble. The night in which this happened we experienced a thunder storm and we have been wondering whether it would be possible for lightning to strike the coil without damage to the rest of the car. We replaced the coil with a new one and the operation of the car was all right.—John Mahood, Argentine, Pa.

On first reading this communication it appears possible that the coil might have had gasoline work into it due to its proximity to the carbureter. On investigating the construction of the 1920 Maxwell, however, we find that while the coil is on the same side of the engine as the carbureter, it would be difficult to imagine how gasoline could get into the coil although it is open at the top. Even if gasoline were poured into the coil, there is apparently no reason for it exploding, as even in the operation of the ignition system there is neither spark nor heat nor flame inside of the coil.

One peculiar condition in the description is that the trouble in the ignition coil put the lighting circuits out of commission and a new ignition coil made everything on the car all right. This is apparently an electrical impossibility. It also appears to us to be unlikely that lightning could strike the car without affecting the building, and furthermore, a great deal more unlikely that it could strike the coil without hitting the car. We accordingly pass, as far as an explanation is concerned, as we have no idea of any cause which would account for an explosion of this kind.

A somewhat similar experience, however, occurred in the New York Westinghouse station at one time when a Kissel car was being worked on. It had been in the shop about three days and when an attempt was made to start it the starting motor apparently exploded, commutator bars flying out and making large dents in the commutator cover. On close examination, however, it was found that right above the starter was a leaky carbureter which had apparently contributed enough fuel to make an explosive mixture which had apparently worked to the inside of the starting motor and possibly into the armature. Then when sparking occurred at the commutator and brushes the mixture was apparently ignited, with the results as above indicated. There also seemed to be another possible explanation in the driving clutch sticking and throwing the armature to pieces by centrifugal force. While we had two possible explanations for the trouble with the starting motor, there does not seem to be any plausible one for the ignition coil.

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Address of business firms will not be published in this department, but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

MOTOR GENERATOR FOR CHARGING FORD MAGNETS MUST HAVE LARGE CURRENT CAPACITY

Q—How can we use a motor-generator which is used to recharge storage batteries so as to recharge a Ford magneto? What other equipment is needed and how could it be used?—Alvin Groff, Grayville, Ill.

The motor generator will not be suitable for charging the Ford magnets unless it is capable of giving out 50 or 60 amperes at 25 or 30 volts. However, as you are able to charge storage batteries it will be no trouble to take about four 6-volt batteries and connect them in series for the purpose of doing this work. The only other equipment needed is a magnetic compass which should be checked away from all machinery to see which end points toward the North.

The slanting door on top of the transmission should be removed and the spark plugs taken out of the engine. The engine should then be turned over slowly by hand until, by inspecting the flywheel through the opening on top of the transmission, it is found that one of the brass studs which holds the magnets on is as much at the left of center of the car as the next stud is to the right.

The compass can now be held on top of the transmission about 2 inches in back of the terminal and 1¾ inches to the left, and the end which pointed north when checking should now point toward the radiator. If it points toward the rear of the car the flywheel should be turned the distance of one brass stud. With the brass studs straddling the center of the car and the compass in the location just mentioned, pointing with the north end toward the radiator, we are ready to begin the charging process.

The regular wiring should now be removed from the magneto terminal and the positive end of the string of batteries connected to this terminal. In doing this fairly heavy wire should be used, ordinary lamp cord for example being too light. The negative end of the string of batteries can now be flashed to the frame of the car some 15 or 20 times which will do a fairly good job of recharging. However for slightly better results the crank can be turned exactly 90 degrees and the engine again checked with a compass and by inspecting the flywheel. The recharging process can now be repeated, this being done at every quarter turn of the crank for best results.

1921 DODGE CLUTCH

Q—On a Dodge 1921 the clutch grabs very much. Neatsfoot oil was poured over it with no results. The clutch does not slip. About six months ago the clutch was removed to put a new bearing in it and a few fiber spacers were put in clutch shaft to take out end play. Since then clutch grabs and almost throws driver out of seat. How can this be remedied?

Grabbing of the clutch is due to too tight an adjustment. Adjustment on the Dodge clutch is secured by compressing the clutch spring sufficiently to allow the split washer which fits into one of the three grooves to be moved. If the split washer is in the front groove we would advise that you move it to the center groove and then try the clutch and if it still continues to grab we would suggest moving it into the third or last groove. Care should be taken that the two halves of this split washer fit securely into the proper groove on the clutch shaft and that the clutch spring collar fits snugly around the split washer.

2—Name all disc wheel manufacturers and their addresses, or as many as you can.—Otto F. Kafka, Jr., New York City, N. Y.

2—This will be answered by letter.

Architectural Service

IN giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

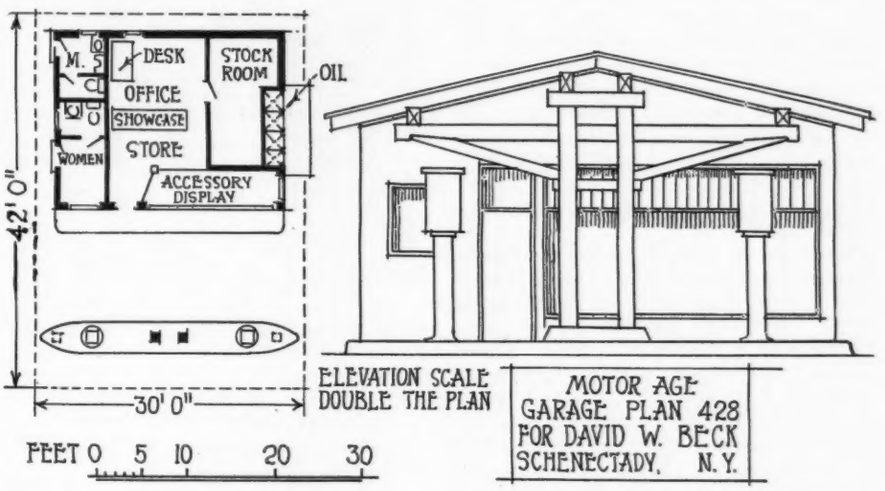
And how much of an accessory department is anticipated.

Filling Station With Roof Scheme Suggested

Q—Being a subscriber to MOTOR AGE, I am taking the liberty of asking your advice on the layout of a gas filling station, not so much of the grounds and tanks, but particularly of the building, as there seems to be only one logical location for same on this particular ground.

I have laid out a sketch of the property and the estimated size of the building. I want a roof from the building to the pumps and do not know just how to construct it, whether to make it flat or sloping. In order to avoid too long a span, I made the inner drive just wide enough for one car, and this will tak care of the business on stormy days.

I want to build the whole building as cheaply as possible and will use lumber with beaver board inside instead of plaster. I do not want a cellar. I want to have a ladies' restroom on one corner with men's toilet adjoining, and about five one-barrel oil tanks with pumps inside the building, and if you have specifications of a building resembling this layout will you kindly forward same?—David W. Beck, Schenectady, N. Y.



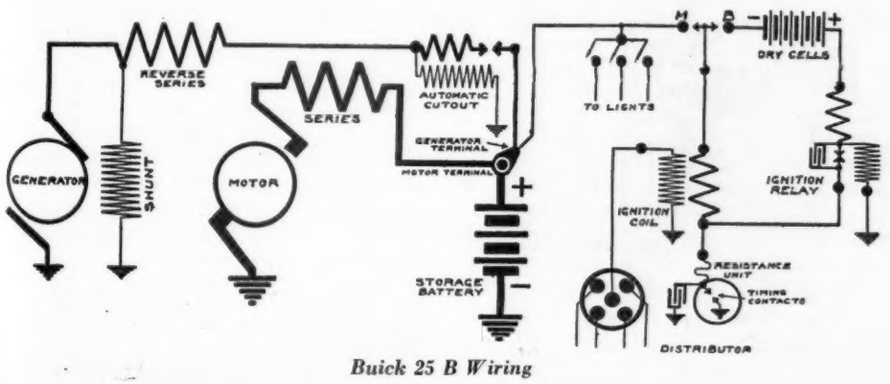
Your plan is very well thought out with one exception. If you are going to handle accessories it would help sales considerably to place an accessory display window where you have the oil pumps and move them around to the side of the building where they would be just about as handy.

There are a hundred different ways of building your roof, any one of which would keep the rain off. A flat roof would be cheapest and could be made good looking as well. It might be better to place the posts between the pumps so that the pumps could be well apart. They should be separated 16 ft. at least. If the roof is extended 2 ft. further it will provide ample protection for the attendant on both sides of the island and this is really all that is needed, the cars themselves needing no shelter.

AMMETER ON BUICK PREVENTS ENGINE STOPPING

Q—We have a model 25 B, 1914 Buick in the shop which will not stop when the ignition switch is turned off. It has a two-throw Delco switch, one side for dry cells, the other side labeled magneto, connecting the ignition circuit to the storage battery. We have installed an ammeter, connecting it from the generator brush to the magneto side of the ignition switch. The ammeter works fine with the above connection, but the motor will not stop when the switch is shut off. Could you give us a diagram of the wiring or tell how to connect the ammeter so that it will work without being connected to the ignition switch. By removing the ammeter wire from the ignition switch, the starter and generator will not rotate to mesh the starter gears. What changes can be made, if any, to make the ammeter show charge and discharge?—Wild Bros., Springfield, Minn.

1—The figure below shows a diagram of the model 25 1914 Buick electrical system. The trouble being experienced, no doubt, is due to improperly installing the ammeter. The correct method was given on page 41 of the May 18, 1922, issue of MOTOR AGE and briefly involves the cutting in two of the egg shape copper strip which connects the large terminal on the motor generator to a small terminal nearby. This copper connection is sometimes on the outside of the motor generator, in which case it can be easily cut with a hack saw. On other machines it is internally used and it is necessary to take the machine apart in order to saw it in two. After this copper strap has been cut in two the ammeter is merely connected with one wire to the large terminal and one wire to the small terminal, making the connection formerly made by the copper strap.



Buick 25 B Wiring

If the ammeter reads the wrong way it is only necessary to reverse its connections, as nearly as we can determine from the description given, the ammeter must have been connected from the genrator brush to the coil terminal of the ignition switch instead of magneto terminal, as you described, for if you had connected as you said the battery would be continuously showing discharge through the shunt winding of the generator.

If the ammeter was connected, however, as you think it was, the closing of the ignition switch would complete a circuit from the heavy terminal of the motor generator to the ignition coil, thus giving ignition current. At the same time there would be a connection from the ignition coil terminal of the switch to the generator which would allow it to motor for the purpose of meshing the gears. If the machine does not motor without the use of the ammeter, it is no doubt due to the fact that the catch on the starting mechanism is not closing the relay contact. This mechanical closing of the cutout is necessary to allow battery current to flow through the generator windings and cause it to run as a motor. We believe that if you install the ammeter as briefly described herewith and as shown on page 41 of May 18 issue of MOTOR AGE, and, furthermore, if you see that the operation of the starting pedal mechanically closes the cutout, that you will have successful operation.

FORDSON TRACTOR VAPORIZING SYSTEM

Q—Publish a sectional drawing and explain operation of the new Holley kerosene carbureter used on the Fordson tractor.

1—The kerosene carbureter used on Fordson tractor is shown in Fig. 1, but as this is but a small part of the kerosene vaporizing system Fig. 2 is also given which shows the whole vaporizing assembly. The operation of the carbureter itself is not greatly different from any typical gasoline carbureter. The left hand view in Fig. 1 shows the Holley carbureter while the right hand view is an enlarged cut of the mixing chamber which is given in the upper right hand portion of Fig. 1.

Referring to Fig. 1 which shows the carbureter only at the left hand view it will be seen that the kerosene comes in at the lower right hand corner and goes up through a float valve which is controlled by the float. A flow of kerosene from the float chamber is regulated by the needle valve adjustment and the vaporization takes place as the air passes by the nozzle. Referring now to the cut showing the whole vaporizing system, the action in starting the tractor engine is to turn the shifter valve so that the letter "G" which stands for gasoline is exposed. This allows gasoline from the small auxiliary tank which is used for starting only to flow to the mixing chamber where it is vaporized by air coming from the air washer which is at the left in this cut.

After the motor has been running at least one minute the shifter valve is turned to the vertical position uncovering the letter "K" which stands for kerosene. Vapor from the carbureter is now drawn up through the vapor tube or heating coil which is heated by the hot exhaust gases and through this tube the kerosene vapor proceeds to the mixing chamber from which point it flows through the intake manifold to the various cylinders. For a thorough understanding of the vaporizing system used on Fordson tractors it would be well to thoroughly study the information given in the Tractor Manual which covers not only the points given herein but also carefully describes the air washer giving details as to attention required and also explains in greater detail the various features of the vaporizer.

2—With a compression tester made out of a tire tester what would be the compression reading on the following cars and tractors: Hudson, Essex, Buick Six, Chevrolet, Dodge, Ford, Fordson tractor and Moline tractor?

2—We are unable to give the exact figures on these various cars and tractors and even if figures were given they would be of little value. The use of a compression tester is of greatest advantage in getting comparisons rather than absolute values as different results might be obtained on the same engine if checked up by two different men due to variation in speed of cranking or other variables difficult to determine. If all the cylinders of any engine are checked however it would be possible to see if

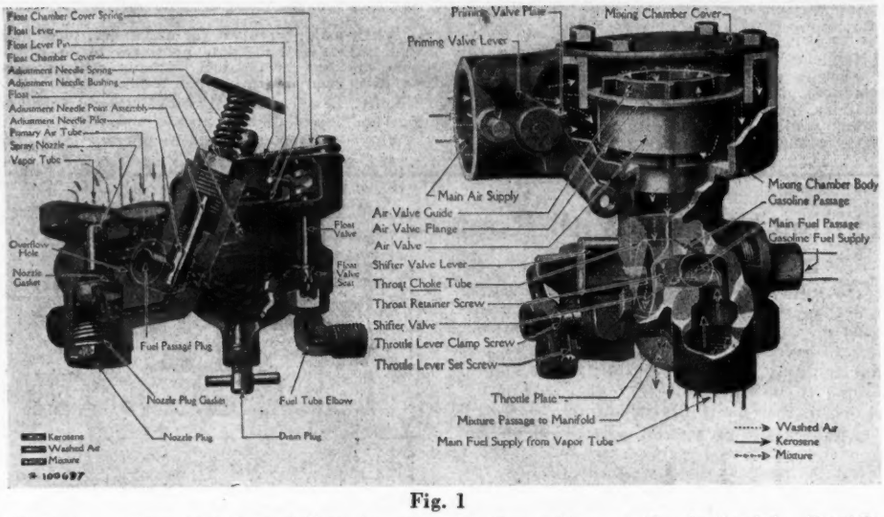


Fig. 1

there is a very great variation in any of the cylinders and if one is much lower than the others it would possibly indicate that its valves were warped or its piston rings needed replacing.

3—Show a sectional view of the Zenith carbureter used on Ford cars.

3—A view of the Zenith carbureter such as used on Ford cars is shown in Fig. 3. Gasoline from the tank enters the strainer body "D" and passes through the filter screen D1 and then enters the float chamber through the needle valve "S," lifting the float "F." From the float chamber to the motor the gasoline flows through three different channels, in various quantities and proportions, according to the size of nozzle, speed of the motor and the degree of throttle opening.

With the throttle fully open, most of the gasoline flows through the channel "E" and main jet "G," some flows through the compensator "I," which is located at the bottom of a well open to the atmosphere through holes not shown which lead to channel "K." The flow is then to the cap jet "H" which surrounds the main jet. Main jet and cap jet work together and furnish the proper mixture whatever the speed of the motor. A low speed and idling device operates due

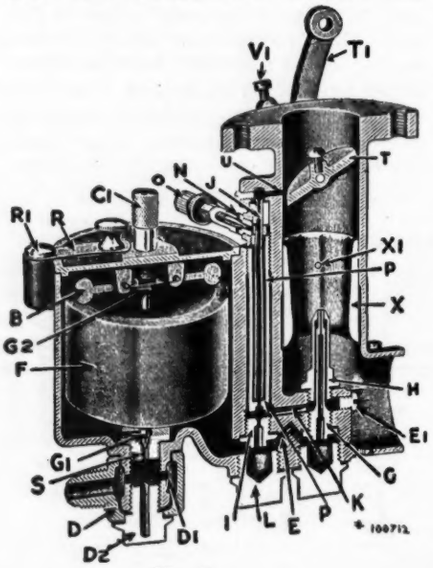


Fig. 3

to the action of the butterfuly throttle valve "T" when it is nearly closed.

The main jet and cap jet then give little or no gasoline but as there is considerable suction on the edge of the butterfuly valve, the gasoline is drawn through the idling device. The idling screw "O" regulates the air which enters to form the proper mixture when idling. This adjustment however has no effect on the operation when running at medium and high speeds as this adjustment is determined by the size nozzle used. If under running conditions the mixture is too lean it indicates that larger jets should be tried while if the mixture is too rich under running conditions smaller jets should be tried, when the proper jets have been determined no further adjustment is required.

4—What is the address of the Pierce-Arrow Motor Car Company?

4—Pierce-Arrow Motor Car Company, Buffalo, New York.

5—What is the address of the Rolls-Royce Company?—Obe Law, Indianola, Iowa.

5—Rolls-Royce Company of America, 785 5th Ave., New York City.

MOLINE TRACTOR STARTING MOTOR

Q—We have a starting motor which has been taken from a Moline tractor. It runs all right on 6 volts but will not run on 32 volts. We wish to use this starting motor in connection with a 32 volt farm lighting plant and would like to know how to connect it up.—O. E. Olson, Light Plant & Garage, Froid, Mont.

The 6 volt starting motor cannot be used on 32 volts, and if you tried it and found it did not work it was possibly due to the fact that you may have used wire that was not large enough to carry the current. If you had used heavy cable you would probably have burnt up both the starting motor and the battery. If you have cables heavy enough you can no doubt connect them across three cells out of the 32 volt battery for operating the starting motor. This would however, be far from satisfactory as these three cells would rapidly become discharged. Briefly summing up the situation we would say that the use of the 6 volt starter on a 32 volt battery is impossible.

We are somewhat curious to know why

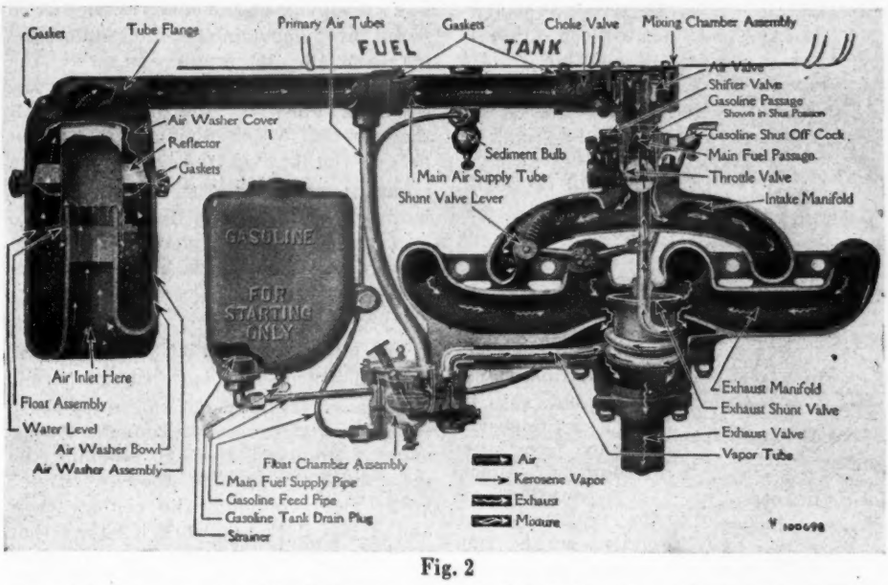


Fig. 2

you wish to use a six volt starter as on 32 volt farm lighting outfits it is customary to use the generator as the starting motor, using current from the whole 32 volt battery when starting. Then when the engine starts the machine stops motoring and starts charging the battery.

IGNITION DRIVE RATIOS, LUBRICATION AND PISTON FITTING

Q—We have recently received information from MOTOR AGE in regard to using a battery ignition distributor on a Ford generator. In this connection you say that if the Ford generator goes exactly 1½ engine speed that a 3 to 1 reduction should be used from the generator shaft to the ignition shaft. You also state that the worm should have seven teeth and the worm gear 21 to give a 3 to 1 ratio. On some worm gears that we have here, however, there are only 2 or 3 or 4 teeth at most across the face of the worm. Do you count around the worm or across the face in checking up the number of teeth? If we use 3 to 9 ratio or 4 to 12, would it be all right, that is, the same general ratio as used on a six cylinder car but with a four cylinder timer shaft and distributer cap?

1—The way to check the number of teeth on the worm is to look at the end of it for it might be better to consider that these are threads instead of teeth. We doubt if you will find a worm and gear where you will really have a 3 to 9 or 4 to 12 ratio although you might get such a ratio by using bevel gears. The main thing is to get the 3 to 1 ratio and the best way to check it is to turn one of the shafts three times and see if the other goes around exactly once, repeating this process several times to make sure that the ratio is exact.

2—How can we increase the oil pump flow on a 7W Continental motor. We cleaned out all the oil pipe, put on a new pump and still the gage shows no increase. We also tested for air leaks and everything seemed to be in good condition. We also tried a new gage but the results were the same. There is a certain amount of oil flowing but it does not seem to be enough at high speed.

2—In Fig. 4 there will be seen a sectional view of the Continental 7W-engine and on the left side and in about the center of the cut will be seen the oil pump, the most prominent feature of this being the spiral spring which lies horizontally. The spiral spring is holding a small piston against an eccentric which is mounted on the camshaft and it occurs to us that possibly the eccentric has come loose and may not be positively driven by the camshaft. If such were the case it would occasionally turn operating the pump and occasionally slip allowing the pump to fail to operate.

If the spring is not stiff enough you might also get some trouble at high speeds due to the fact that the piston would not come back quick enough to pump oil. Also a tight or loosely fitting piston would give trouble. The tight piston would not come back quickly

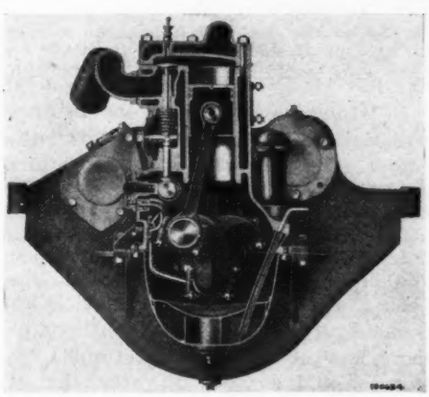


Fig. 4

enough and the loose piston would allow leakage. So many of these engines are in service that the design is doubtless correct but if you wish to get a higher oil pressure this might be accomplished by making a special eccentric which would give the pump greater motion. The trouble in pumping would also be caused if either of the ball checks should stick. The conditions of these can doubtless be determined by inspection or by blowing through the pump to see if the ball checks work properly.

3—Is it good workmanship to lap pistons and rings after grinding and what is the gain derived in making pistons fit with .005 clearance or fitting to .003 and then lapping for the additional clearance? Is it not a fact that the glaze has to form on the cylinder walls before the final compression takes place which can only be obtained by a certain amount of running? Does not the expansion due to heat overcome all of the fine points that would be obtained by lapping in the pistons to fit the cylinders? With the present day dense gases is it not better to have more freedom between the piston and cylinder wall than to have too tight a fit?—Modern Auto Parts Co., Terre Haute, Ind.

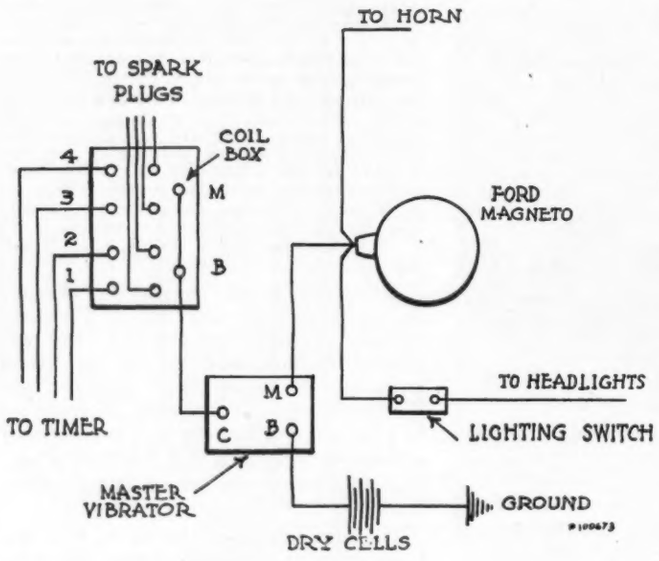
3—There is no mechanical way of making parts so that they will fit perfectly together. This is illustrated by the fact that all engines must be run for a time at comparatively moderate speed so that the parts may be allowed to wear so as to fit each other. For this reason even a grinding operation will not give a perfect fit between the piston and cylinder wall.

The idea of lapping the parts together is to use a fine abrasive which will produce this natural fitting action in a shorter period of time than would be produced by actual service. For this reason the lapping operation is no doubt better as it does not require the motorist to complete the job by hundreds of miles of careful running. For commercial results we believe that a grinding job together with rings carefully selected to be the right size for the cylinder without filing to any extent will give satisfaction, although grinding to a close fit and lapping to get the desired clearance is no doubt a better job mechanically.

A glaze on the cylinder walls and pistons indicates that the roughness has been reduced to a minimum and the fit should accordingly be as good as it is possible to obtain. As the compression depends on the fitting of the rings with the piston and cylinder walls it is no doubt true that the compression will be greatest after the walls and rings have glazed and made perfect contact. We do not believe that expansion appreciably affects the fitting.

In the first place it will cause the pistons to more nearly fill up the cylinders and in the second place will cause the piston rings to elongate slightly so as to close up the gap where the ring is slit both of which would tend to give better compression and if the piston and cylinder are both cylindrical this would not affect the fit. For thorough discussion of the question of fitting pistons and cylinders also on regrinding would refer you to two articles recently appearing in MOTOR AGE, one on page 16 of May 18 issue, and the other on page 16 of the May 25 issue. These articles also give factory practice, method of finishing and clearance allowed on many of the more popular cars.

The matter of fuel density has no bearing on the question of piston fitting. It only comes in to the problem due to poor vaporization which allows raw gasoline to work past the rings and get down into the crankcase, but regardless of the fuel used we always try to have the fit of rings to piston and cylinder wall as good as possible.



MASTER VIBRATOR TROUBLE DUE TO BEING INCORRECTLY WIRED

Q—We have a Ford car on which a Master vibrator is being used. When operating on magneto the engine will also stop if the headlamps are turned on. The Master vibrator is wired in accordance with instructions. The Master vibrator will operate by itself when connected to a single dry cell. It vibrates with the Master vibrator battery switch turned on, and the headlights will also burn if that switch is on and the timer is in contact, with the engine stopped. The engine runs imperfectly with a loud exhaust and the exhaust manifold gets red hot. The Master vibrator produces unusually hot spark, and cannot be adjusted to give much variation. What is the cause of this trouble.—Jno. V. Loeffler, Evansville, Ind.

The cause is doubtless in the Master vibrator being incorrectly wired regardless of your statement to the contrary, although we have not been able to figure the exact nature of the circuit which would give the symptoms described. In the figure above we have given a wiring diagram which will give correct results on the Ford car. Tracing the separate circuits you will see that from the Ford magneto current goes directly to the horn. From the magneto it will also go to the lighting switch and directly out to the headlights. From the Ford magneto it can also go to the "M" terminal of the Master vibrator and when the Master vibrator switch is turned to magneto it will then go through to the "C" terminal of the Master vibrator and over to the "B" and "M" terminals of the regulation Ford coil box.

We have shown all wires removed from the "B" and "M" terminals of the regular Ford coil box except the one connection to the Master vibrator as we suspect some complication at this point is causing your trouble. No change is required in either the spark plug wires or the timer wires. One end of your set of dry cells will be grounded and the other end will be connected to the "B" terminal of the Master vibrator. Before wiring as shown in this sketch would suggest testing the Master vibrator to see if in the battery position it is possible to get any connection from the "M" terminal to either of the others. Also test it in the magneto position to see if it is possible to get any connection from the "B" terminal to any of the others. If there is no circuit through as above indicated we would say it would be impossible to have the headlamps affect the operation of the ignition especially with the switch turned so as to run on the dry cells.

A diagram of the wiring for Ford cars having no starter and not equipped with a Master vibrator was given on page 45 of the June 29th issue of MOTOR AGE, and the wiring shown here is similar, only those changes being made which were required by the use of the Master vibrator.

MAIN BRUSHES OFF NEUTRAL CAUSE OVERHEATING

Q—A Westinghouse generator on a Chandler car needed to have the output reduced. As the third brush adjustment is hard to get at, the nuts which hold the brush holder assembly were loosened and the whole rocker ring was turned in order to reduce the charging rate to 12 amperes. Is there any objection to this method? The generator now heats up to the extent that the hands can hardly be held on it. All wiring connections on the car have been cleaned. The generator has just been overhauled at the factory.

1—While moving all of the brushes will weaken the field and cut down the output, it also has the effect of putting the main brushes in a part of the commutator where they are not on neutral. This will doubtless result in excessive sparking and may account for the heat you have experienced. Aside from the heat and destructive arcing which affects both brushes and commutator there may be no additional trouble result. Would suggest, however, that it would be well to properly set the main brushes and then adjust the third brush whenever it is convenient to take the generator off of the car and check it on a test bench.

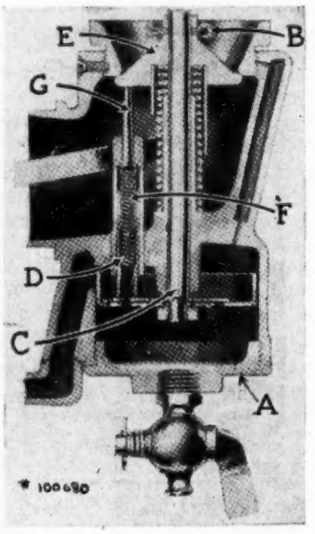
2—A Bosch magneto will not stop when the switch is turned to the off position. Even a screw driver held against the breaker case and on the ground terminal has no effect. The small carbon brush on inside of case is O. K. What is the cause of the trouble?

2—Stopping of the Bosch magneto by grounding it depends on three brushes. One will be found at the bottom of the magneto and is located by turning the magneto upside down. This should make firm contact with a brass ring at one end of the armature. Another brush is at the back of the interrupter and is found by removing the interrupter. To take off the interrupter unscrew the hexhead screw at the center of the interrupter and pull the interrupter all the way off. When replacing be careful to get the key in the keyway of the armature shaft, as otherwise the points will open at the wrong time. These two brushes are called ground brushes and make a good connection between the rotating armature and the stationary part of the magneto.

The other brush which you say is O. K. is also necessary but will not permit shutting off the magneto unless the other two are making good contact. Would suggest that you also try stopping the magneto by removing the interrupter cover and grounding the center screw and if this does not work it shows that the two grounding brushes just described are not touching.

3—On a Rayfield carbureter the high speed adjustment was cut down as much as possible, but the resulting mixture was still too rich. The carbureter was taken apart and all nozzles were found to be tight. The timing valve and float level were also O. K. The vacuum connection was also disconnected but this had no effect. The threaded flange on the large air intake was then unscrewed to give more air, but this did no good. It was then returned to the original position and ⅛ of an inch was cut off of the metering pin and this appeared to help it, but in order to avoid choking up, it was necessary to set the low speed adjustment too weak. What would you advise?

3—Change the No. 4 metering pin to a No. 3. In order to change the metering pin reference should be made to cut below. Take off dash pot cover (A) being careful not to lose the gasket. Remove cotter pin B at the top of air



valve cone. Push air valves E all the way down and with a punch small enough to pass through the cone, push piston stem C through cone. In doing this, be very careful to see that piston and metering pin do not fall with dam-

aging results. After changing metering pin G clean all parts thoroughly and reassemble, making sure that hole in piston is in line with metering pin.

Before replacing the piston, push the air valve cones all the way down making sure that lowerer carbureter butterfly valve is in proper position. It should be wide open. In removing and replacing cotter pin, great care should be taken to see that the piston stem is not sprung out of alignment. Should any trouble be experienced in loosening dash pot cover A, tap lightly on the bottom with a hammer and it will start very easily.

The larger the number of the metering pin the more gasoline it will supply. Number four gives a richer mixture than number three. If the mixture is rich at high engine speed put in the next smaller number metering pin and if the mixture is lean at high speed put in a larger number metering pin. If you have no place to run the car at high speed, you can get the engine speed by running it in second gear. This will tell whether the mixture is lean or rich.

4—A Chandler ring gear appears to have small steel strips set in on the wearing side of the teeth. Please explain construction.

4—We never heard of this construction being used on a bevel ring gear nor have the Chandler people here in Chicago any information on construction of this character. We accordingly assume that what you figure to be a steel strip is merely a worn place which is polished more than the rest of the tooth and accordingly has a different appearance. Would suggest that you judge the condition not by the appearance of the surface of the tooth but by the end of the tooth and give special attention to see if there is a line showing on the end of the tooth where a piece has been set in. We are under the impression that this is not the case, but if so, it may have been done by some energetic machinist.

5—Some time ago we noticed in MOTOR AGE a short article referring to the possibility of permanently expanding pistons by heat and in the MOTOR AGE answer to an inquiry on this subject the doubt was expressed as to the possibility of doing this. When overhauling an engine recently which requires pistons .0025 oversized we heated up one of the old pistons red hot and allowed it to cool. It would then enter the cylinder as far as the wrist pin hole but the skirt would not go in at all, showing that there had been expansion. There appeared, however, to be no warping which would account for the piston binding. We have also heard of raw iron bars being lengthening permanently by heating, but in this case they were quenched in water.—W. C. Landon, Myrifield, Mass.

5—The test on expansion of iron by heating are very interesting and MOTOR AGE has nothing definite to say on this subject, having not had the opportunity of conducting tests along this line.

GENERAL METHOD FOR WASHING CARS

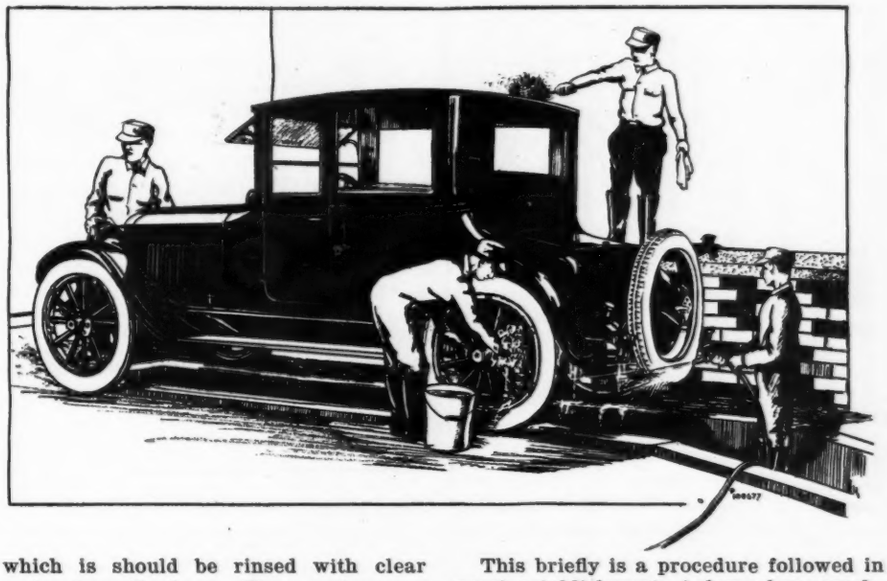
Q—Have you data regarding just how a car should be washed, that is, the correct procedure to take on the wash rack? Send us any information you may have of manufacturers of mechanical washers. —The Pioneer Auto Company, Seattle, Wash.

We assume that you have the necessary materials for washing which are as follows: At least two clean sheeps wool sponges, two ten quart pails, several clean wiping chamois cloths, a quantity of cheese cloth, a quantity of pure linseed oil soap or ivory or castile soap, a duster and the necessary facilities for running water. In addition there should be at least two wooden barrels on which should be mounted a wringer for removing water from the chamois.

The procedure taken in washing a car differs according to the size of the establishment, that is, according to the number of men assigned to the particular car which is to be washed. Assuming there are three men assigned to a washing job the first man should be equipped with a step ladder and will start the job by dusting the top with a duster and afterwards going over it with a damp cloth, finishing with a dry cloth. After the top has been cleaned the inside of the car, the cushions and the windshield and other glass about the body should be cleaned in the order named.

The inside of the glass should be washed and the outside can be left until the body and running gear have been completed. In the larger establishments warm or luke warm water is used for washing the running gear and body. After the car has been dusted and the windows cleaned on the inside the hose should be played on the running gear to remove all excess mud from underneath the fenders and on the axle and other chassis parts. With a reduced pressure the body should then be sprayed to remove any loose dust.

The next procedure regardless of the number of men engaged on the particular job is to thoroughly wash the body after



which is should be rinsed with clear water from the hose. The running gear is next to receive attention. A preliminary washing should be given with soap and water and if any portions of the chassis are so covered with grease that the soap will not remove it, it is advisable to use kerosene or gasoline using a separate sponge which should never be dipped into the pail containing the soap water. After the entire running gear has been washed with gasoline it is then rewashed with soap and rinsed with clear water.

Most large washing establishments when washing the running gear portion of the car start at either the front or rear and by means of the steering gear are enabled to get at all portions of the front wheels without the necessity of using a jack. Especially for the running gear warm water is recommended as it will assist greatly in removing any accumulations of grease which is not of long standing. After the chassis or running gear has been thoroughly washed and rinsed the chamois or drying operation is begun.

This briefly is a procedure followed in most establishments today where washing is carried on in a large scale. A few hints regarding washing are as follows: To wash the car first play a fairly strong stream of clear water on all chassis parts until the mud is thoroughly softened and mostly removed. To avoid scratching the finish the nozzle coupling should be removed from the hose end. To prevent accumulations of grease on the sponge used for the chassis or the body it is advisable to go over grease spots with a cloth or sponge saturated in kerosene or gasoline. Rinse sponges frequently.

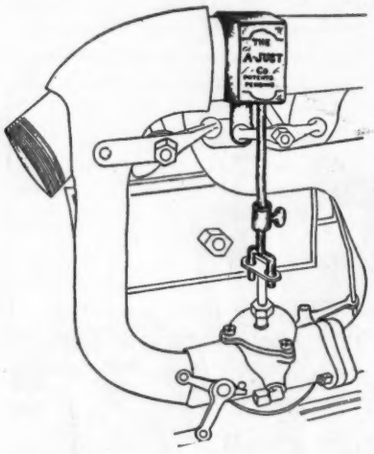
Rubbing with sponges and chamois should be done on a straight line rather than in circles. Do not use a feather duster on body surfaces as it will tend to scratch the finish. You should also bear in mind that the chamois should be frequently dried through the wringer during the washing operation. Regarding information on mechanical washers we would advise that you communicate with the Automobile Trade Directory, 239 W. 39th St., New York, N. Y.

The ACCESSORY SHOW CASE

New Sources of Retail Profit

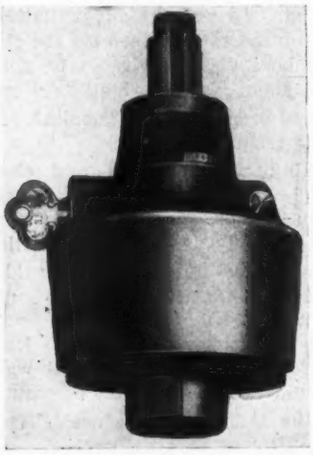
THE A-JUST FOR FORD CARBURETERS

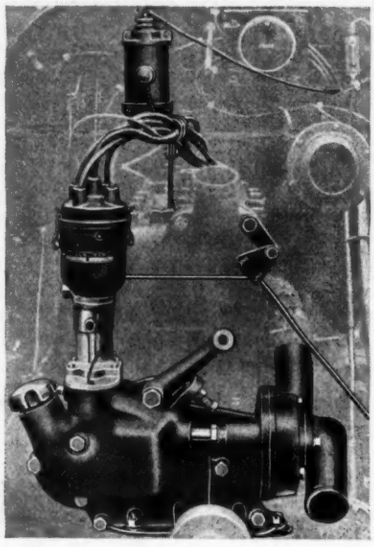
This is a thermostatic device attached proper to the exhaust manifold just above the carbureter with a forked rod extending to the adjustment control. When the engine becomes sufficiently hot after a short period of operation the thermostatic device automatically decreases the amount of gas being consumed. Price $2. Grundy Mfg. Co., 2900 Meldrum ave., Detriot.



DEFIANCE LOCK FOR FORDS

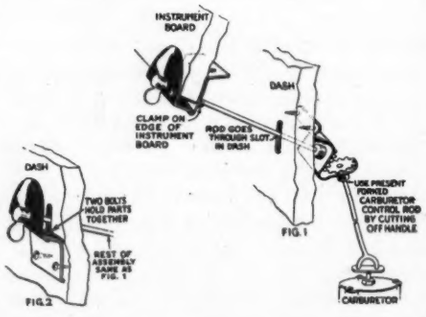
Turning the key raises the clutch above the lower pinion throwing the steering gears into neutral. A case hardened steel housing protects the steering gears from tampering. A safety plunger makes it impossible to accidently lock the wheel while driving. A 17 in. walnut steering wheel is furnished with the lock or the lock only can be obtained if desired. Price $12 complete with steering wheel. Defiance Lock Co., Detroit.





WATER, OILING AND IGNITION SYSTEM FOR FORDS

This is a single unit giving a new raised timer, a forced feed oiling system and a water circulating pump. It is attached at the front of the motor and takes the place of the timer plate. It is not necessary to drill holes. Price $31. Hexagon Specialty Mfg. Co., 3630 So. Grand Ave., St. Louis.



IMPERIAL CARBURETER CONTROL

The Imperial carbureter control for Ford cars can be mounted on either the instrument board or directly on the dash and includes a dial to allow adjustment of the carbureter while driving. Price, 95 cents. Imperial Brass Manufacturing Co., 1200 W. Harrison St., Chicago, Ill.

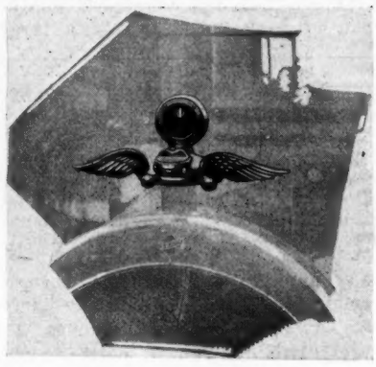
SANI-MIST POLISH

Sani-Mist Polish is used for cleaning and polishing cars. $1 a quart. Sani-Mist Co., New London, Conn.

STIRLING MOTOR METER LOK

The Stirling Motor Meter Lok is the product of the East Chicago Mfg. Co., 4426 S. Olcott ave., East Chicago, Ind., and is made in two sizes, the Junior model for Fords and Chevrolets and the larger model for other cars.

The lock is of bronze, nickeled and polished, and is furnished with two wings, making for a decorative effect on the car. The large model sells for $5.65 and the Junior for $4.90.

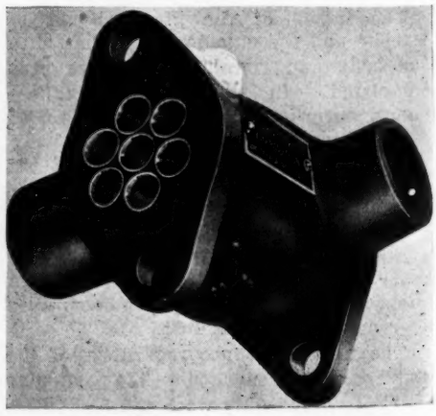


BUTLER VAPORIZER

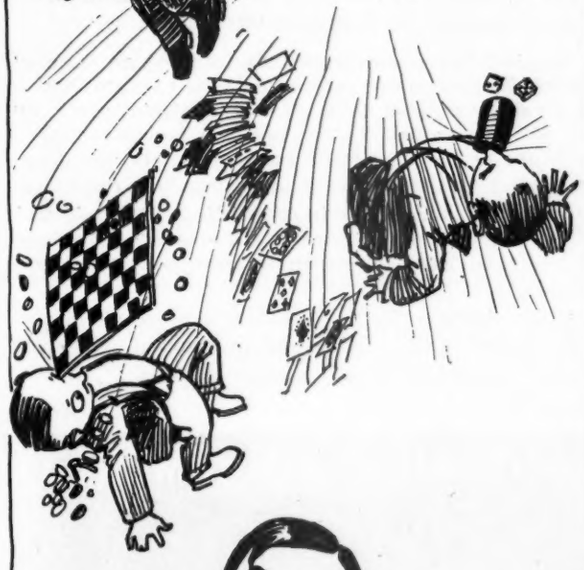
The Butler Vaporizer is installed between the carbureter and intake manifold. Exhaust gases are conducted through another flexible tube leading beneath the chassis. This waste heat from the exhaust superheats the raw gasoline through the tubes, and in combination with a higher gas velocity in the smaller tubes, delivers a uniform, finely mixed dry vapor, it is stated.

In construction a gray iron casing encloses hard drawn copper tubes swedged permanently in place. The weight is from 1½ to 2½ lbs., according to size.

The vaporizer comes in sizes from 1-in. to 2-in. and varies in price from $20 to $34, excepting the Ford size which sells for $15.—The Butler Vaporizer Corp., 7 East Forty-second street, New York City.



A Rhymed Fable in Slang



A RHYMED FABLE IN SLANG

A DEALER who's name was BILL BUNCH
Got STUNG by a BEE called a HUNCH.
HE cleaned up his SHOP, from cellar to TOP,
And put everything in its PLACE.
HE made a great VOW, that he'd start 'here and NOW'
To WARM himself up for the RACE.

HE cut out the CARDS and the CHECKERS and PARDS
That LOAFED 'round his PLACE by the WEEK.
He frowned on their BUNK and straightened out JUNK
That ALWAYS had played HIDE AND SEEK.

HE ran a small AD which wasn't so BAD
For a start IN the Race for a SCORE,
So HE ran it AGAIN and DOUBLED his YEN
From the Jobs that came into his store.

Now BILL gets the JACK for the Goods on his RACK,
When he DRESSES it up for a SALE.
HE says 'SWAN and DECLARE, my BUSINESS is FARE,'
While the REGISTER adds up the KALE.

It SOUNDS like a FABLE but still I am ABLE
To prove that this STORY is TRUE.
YOU first GET the hunch then START with a PUNCH.
IT will END up the SAME way for YOU.

—R. EVANS BLACK, Waterloo, Ia.

Flagging the Elusive Dollar Through the Window

The Value of the Show Window as the Big Department Store Finds It and as the Automotive Dealer Will Find It

SOME weeks ago, there appeared in MOTOR AGE, the story of a Chicago accessory dealer who, by some legal misfortune had had a sign board erected directly in front of his window on Michigan boulevard. Before the erection of this sign, the dealer's daily sales were between $300 and $400 and immediately after, they dropped to around $9 a day.

Many other dealers, as this article pointed out, might just as well have a sign board in front of their windows for all the good the window does and the purpose of this series is to help the dealer take down the sign board of carelessness and disorder and in its place, install a clean, neat window with a direct "Ask 'Em to Buy" appeal for the car owner.

Window display is one of the most effective ways of reaching into the buying pocket of the public. The drug and dry goods stores all found this out years ago and the result, if it could be figured, would, we think, show very near half of all the sales made in these lines, traceable to the window.

This is best proven by the valuation that the big department stores place on their windows—the Chas. A. Stevens Co., as an instance, value their windows at $150,000 a year. The United Cigar Stores recently formed a subsidiary company for their window space, incorporating at $300,000. Chain drug stores in various large cities maintain a staff of men whose duty it is to go around every week, changing the window displays and creating new ideas.

With this evidence in hand, is it not a safe bet that an hour or so spent at work on your window a month will prove more than a little valuable? At night, when the crowds are in bed, the window dressers of the big stores are at work, perfecting a new something to offer the public in the morning.

Chicago's loop crowds have been made to look at the windows of Marshall Field & Co., as a place to see everything that is the latest, set with beautiful background and a number of people can't quite see why others will go all the way back to Michigan boulevard to look at "art" when it is right there on the busiest thoroughfare.

If only the sales that are a result of these windows could be laid down on paper, automotive dealers, the country over, would not hesitate for a moment but would get to it with a bang and dress that window up.

The window is a more direct appeal to the buyer than any other form of advertising. It can be compared to the personal appearance at your movie house of your favorite star. The cold celluloid effect is removed in the actual smile and the pleasant voice of the star and so in the window, the buyer sees the real thing while circulars and letters merely take him half way.

Some Chicago dealers who are customers of the Chicago Auto Equipment Co. have tried window display as a "go-getter," under the direction of Austin G. Price, display manager of the equipment company. Price has furnished MOTOR AGE with a record of the results achieved by some of the dealers whose windows he arranged. Here are two of them:

R. J. Dickover of the Triangle Auto Service at 5th and Crawford avenue, tried putting in a display every two weeks and eight dozen spark plugs were sold in one week—this is a direct result of the display. Eight timers were also sold from the window.

The Garfield Auto Supply at 4402 W. Madison St., sold six tube repairing outfits in one week from the window alone. Eight spotlights were also sold from this display.

These are just two examples but they are enough to prove that your window, too can be turned into a cash register assistant and a valuable one at that. "Don't be afraid to sell the customer what he needs!" is the key of a recent talk by a Chicago dealer to his sales force and in this talk, the dealer points out to his men the value of presenting "the real thing" to the customer, "just as we do in our window—if you do that, there is no doubt about your making the sale." This man, too has tried and has had proven to him, the value of the show window.

Fear, a big resistance for the salesman to overcome in himself is not present in the window and your appeal, once there can easily be handled when the customer inquires.

The Chicago Auto Equipment Co. is responsible for these windows. Every detail has been attended to, to make them "pull." Note the uniformity of the arrays and at what angles they are set, all with the idea of catching the eye. The passerby coming from either direction is met with the color of the display far enough in advance to make him slow down or stop by the time he reaches the window. A strong "Ask 'Em to Buy" appeal is made here. The background, as will be noted, is of wood panels and the lighting furnished by overhead troughs. Another thing worthy of note is the fact that each window displays but one item at a time.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Columbus, O.	Columbus Auto Dealers Co.	Aug. 28-Sept. 3
Decatur, Ill.	Industrial Exhibition and Automobile Show	Aug. 30-Sept. 9
Peoria, Ill.	Nat'l. Implement and Vehicle Show	Sept. 4
Minneapolis, Minn	Minnesota State Fair	Sept. 2-9
Indianapolis	Indianapolis Automobile Trade Assn.	Sept. 4-9
Wilmington, Del.	Delaware State Fair	Sept. 4-9
Hartford, Conn.	Connecticut Fair Grounds	Sept. 4-9
Spokane, Wash.	Annual Show	Sept. 4-9
Syracuse, N. Y.	New York State Fair	Sept. 11-16
Cleveland	Closed Car Exhibit—Cleveland Automobile Manufacturers & Dealers' Association	Sept. 18-28
Memphis	Memphis Automobile Dealers' Assn.	Sept. 23-30
New York	Closed Car Show—Automobile Merchants' Association	Sept. 23-30
Wash'gton, City of	Closed Car Salon	Oct. 21-28
Chicago	Annual Show of the Automotive Equipment Association	Nov. 13-18
Cincinnati, O.	Second Annual Automobile and Radio Exposition	Nov. 23-29
New York	National Automobile Body Builders' Show	Jan. 8-13
New York	Annual Show	Jan. 6-13
Cleveland, O.	Annual Winter Show, Cleveland Automobile M'f'r's. and Dealers' Assn.	Jan. 20-27
Chicago	Annual Show at Coliseum N. A. C. C.	Jan. 27-Feb. 3
Minneapolis, Minn	Annual Show	Feb. 3-10

CONVENTIONS

Toledo, O.	Annual Convention, Ohio Automobile Trades Assn.	September
Buffalo, N. Y.	M. A. M. A. Fall Convention	Sept. 13-15
Chicago	Show Managers' Assn.	Sept. 14-15
Santa Barbara	Annual Convention, California Automotive Trades Assn.	October
Chicago	Nat'l. Association of Farm Equipment Manufacturers	Oct. 18-20

FOREIGN SHOWS

Berlin	Kaiserdamm Hall	Sept. 25-Oct. 3
Rio de Janiero	Automotive Exhibition	Sept., 1922
London	International Commercial Vehicle Exhibition	Oct. 12-13
Paris, France	Automobile Show	Oct. 4-15
London	Annual Show	Nov. 3-11

RACES

Milan, Italy	Monza Speedway Automobile Club of Milan—500 Mile Race	Sept. 3
Colo. Spgs., Colo.	Pike's Peak Race	Sept. 4
Kansas City	Opening Meet of New Kansas City Board Speedway	Sept. 16
San Carlos, Cal.	500-Mile Armistice Day Race	Nov. 11

A Shop Where Too Much Display Defeats Its Own Purpose

Here is a likely looking small maintenance business in which judgment has been shown in picking certain branches for specialization—cylinder regrinding, electrical systems, and tires and accessories. Not equal care, however, was used when it came to presenting these facts to the public. The casual motorist would not get an impression of permanency nor would his confidence be inspired by the clutter of window signs, tires and wheels.

Here is a suggestion which, if carried out, would change the entire appearance of the place and give it a drawing power which would be definitely shown in figuring up the profits.

Take down all but one of the signs now seen in each window, place the tires tires all in one group on one side in an orderly rack arrangement. It would also be worth while to put in one complete window pane instead of the six small sections with their distracting sashes. A substantial, well appearing stand could be placed in front at the left and on it a cylinder block showing cylinders before and after grinding, with a neat small sign telling the story of why cylinders should be reground.

And above all, and this can be heeded by many, don't let the bill posters plaster up the side walls with posters. They depreciate the appearance of any building and result in a loss that far outweights the few dollars they may bring

The impression of disorder, which hangs about this shop, could be corrected with little effort, or expense. The disorder does not inspire the passing motorist with confidence.

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Acason	¾-1	$1650a	3½x5	34x5n	34x5n	W
Acason RB	1½	1950	3¾x5¼	36x3½	36x6	W
Acason H	2½	2750	4½x5¾	36x4k	36x8k	W
Acason L	3½	3450	4½x5¾	36x5k	36x10k	W
Acason M	5	4350	5 x6¼	36x6	40x12	W
Ace C	1½	2295	3¾x5½	34x3½k	34x5k	W
Ace A	2½	2795	4¼x5½	36x4k	36x7	W
Acme 20	1	....	3¾x5	35x5n	35x5n	W
Acme 30	1½	....	3¾x5	34x3½	34x5	W
Acme 40	2	....	3¾x5½	34x3½	34x5	W
Acme 60	3	....	4½x5¼	36x4	36x7	W
Acme 60L	3	....	4½x5½	36x4	36x7k	W
Acme 90	4½	....	4½x5½	36x5	40x10	W
Acme 125	6¼	....	4¾x6	36x6	40x12	W
American 25	2½	3350	t x6	36x4k	36x4dk	W
American 40	4	4275	4½x6	36x5k	36x5dk	W
Armleder 20	1	....	3¾x5¼	34x3½k	34x6k	W
Armleder 21	1½	....	3¾x5¼	34x3½k	34x6k	W
Armleder 40-B	1½	....	4¼x5½	34x3½k	34x6k	W
Armleder 40-C	1½	....	4½x5¼	34x3½k	34x6k	W
Armleder HW-B	2½	....	4¼x5½	36x4k	38x7k	W
Armleder HW-C	2½	....	4½x5¼	36x4k	36x7k	W
Armleder KW-B	3½	....	4½x6	36x5k	36x5dk	W
Armleder KW-C	3½	....	4½x5½	36x5k	36x5dk	W
Atlas MD	1	1185	3½x5	32x4½n	32x4½n	W
Atterbury 20R	1½	2475	3¾x5	31x3½	34x5	W
Atterbury 22C	2½	3375	4½x5¼	36x4	36x4d	W
Atterbury 22C	2½	3375	4½x5¼	36x4	36x4d	W
Atterbury 22D	3½	4375	4½x5½	36x5	40x5d	W
Atterbury 22D	3½	4275	4½x5½	36x5	40x5d	W
Atterbury 8E	5	4975	4¼x6	36x5	40x6d	W
Atterbury 8E	5	5125	4¾x6	36x5	40x6	W
Autocar 21UF	1½-2	1950	4¼x4½	34x4k	34x5k	D
Autocar 21UG	1½-2	2050	4¼x4½	34x4k	34x5k	D
Autocar 27H	2	2950	4 x5½	34x5	36x7	D
Autocar 27K2	2	3075	4 x5½	34x5	36x7k	D
Autocar 26Y	5	3950	4¼x5½	34x6	36x12	D
Autocar 26-B	5	4100	4¼x5½	34x6	36x12	D
Available H1	1½	2475	t x5	36x3½k	36x5k	W
Available H2	2	2775	t x5	36x3½k	36x6k	W
Available H2½	2½	3160	t x5	36x4k	36x8k	W
Available H3½	3½	4175	4½x5½	36x5	40x5d	W
Available H5	5	5375	5 x6	36x6	40x12	W
*Avery	1	....	3 x4s	34x5n	34x5n	1
Beck A Jr.	1¼	1285a	3½x5	34x4½n	34x4½n	1
Beck B-30	1½	1725	3¾x5	34x5	36x6	
Beck C-40	2	1810	3¾x5	36x6	36x6	
Beck D-50	2½	2395	4½x5¼	38x7	40x8	
*Bell (Penn.)	½	1000b	3½x5	31x4n	31x4n	B
Bell M (Iowa)	1	1495	3½x5½	35x5	35x5n	W
Bell E (Iowa)	1½	2100	3¾x5¼	34x3½	34x5	1
Bell O (Iowa)	2½	2550	4½x5½	34x4	34x6	1
Belmont A	½	725	3¾x4¼	31x4	31x4	B
Belmont D	2	2575	4¼x5½	34x3½k	34x6k	1
Belmont F	3	3500	4 x6	30x5k	30x5dk	1
Bessemer G	1	....	3½x5	35x5n	35x5n	1
Bessemer H-2	1½	....	3¾x5	30x3½	36x5	1
Bessemer J-2	2½	....	4½x5½	30x4	36x4d	1
Bessemer K-2	4	....	4½x5½	30x5	36x10	1
Bethlehem KN	1	1195	3½x5	35x5n	35x5n	B
Bethlehem GN	2	1595	4 x5½	36x6k	40x8k	D
Bethlehem HN	3	2195	4 x5¼	36x6k	42x9k	D
Brinton C	2	2500	3¾x5	14x4	34x5	W
Brinton D	3	2975	4½x5¼	36x4	36x7	W
Brockway E	1	....	3¾x5½	35x5n	35x5n	B
Brockway S-5	1½	....	3¾x5	36x4	36x6	W
Brockway SK	1½	....	4½x5¼	36x4	36x6	W
Brockway KR	2½	....	4½x5½	36x4	36x8	W
Brockway K-5	2½	....	4½x5¼	36x4	36x8	W
Brockway RT	3½	....	4¾x6	36x5	36x10	W
Brockway R-4	3½	....	4½x5½	36x5	36x5d	W
Brockway T-4	5	....	4¾x6	36x6	40x6d	W
*Buick	½	945b	3½x4¾	31x4n	31x4n	B
Capitol G	1½	2975	3¾x5	35x5	38x7	W
Capitol H2	2½	3700	4¼x6	36x4	36x8	W
Capitol K2	3½	4250	4¼x6	36x6	42x9	W
Capitol M3½	3½	4125	4¼x6	36x5	36x10	W
Case	2	....	4¼x5¾	36x6	38x7	1
*Chevrolet	¼	510b	3½x4	30x3½n	30x3½n	B
*Chevrolet G	¾	650	3½x4	31x4n	34x4½n	B
*Chevrolet T	1	1095	3½x5¼	33x4n	35x5n	W
Chicago C1	1½	....	4 x5	36x3½k	36x5k	W
Chicago C2	2½	....	4 x5	36x4k	36x7k	W
Chicago C3	3½	....	4½x5½	36x5	36x10	W
Chicago D5	5	....	4½x5½	36x6	40x12	W
Clydesdale 10	¾-1½	1485	3¾x5	34x5n	34x5n	B
Clydesdale 18	¾-1½	1890	3¾x5	34x5	34x5	W
Clydesdale 20	1-1½	2385	3¾x5	34x5	34x5k	W
Clydesdale 42	1½-2	2475	3¾x5	36x3½	36x6	W
Clydesdale 65X	2½-3	3250	4½x5¼	36x4	36x8	W
Clydesdale 65EX	2½-3	3150	4½x5½	36x4	36x8	W
Clydesdale 90	3½-4½	4100	4½x5½	36x5	36x10	W
Clydesdale 120	5-6	4500	4¾x6	36x6	40x12	W
Columbia H	1½	1995	4 x5	35x5	38x7n	1
Columbia G	2½	2335	4 x5¼	36x4	36x7	1
Comet T	1½	1950	3¾x5	34x4	34x4	W
Commerce T	¾-1½	1450	3¾x5	34x4½n	34x4½n	B
Commerce 12	1½	1800	3¾x5	35x5n	35x5n	1
Commerce 16	2	2150	3¾x5	35x5n	36x6n	1
Commerce 18	2½	2495	4½x5¼	36x6n	40x8n	1
Commerce 25	2½	2425	4½x5¼	36x4	36x7	W
Cook 51	2½	3600	4 x5½	36x6n	40x8n	W
Corbitt E-22	1	1480	3¾x5	34x3½	34x4	W
Corbitt D-22	1½	$2200	3¾x5	34x3½	34x5	W
Corbitt C-22	2	2600	4½x5¼	36x3½	36x7	W
Corbitt B-22	2½	3000	4½x5¼	36x4	36x7	W
Corbitt R-22	3	3200	4½x5½	36x4	36x8	W
Corbitt A-22	3½-4	3800	4½x5½	36x5	36x10	W
Corbitt AA-22	5	4500	4¾x6	36x6	40x6d	W
Day-Elder AS	1	1600	3¾x5	35x5n	35x5n	W
Day-Elder B	1½	2000	3¾x5	34x3½	34x5	W
Day-Elder D	2	2400	4½x5¼	36x4	36x7	W
Day-Elder C	2½	2750	4¼x5½	36x4	36x7	W
Day-Elder F	3½	3150	4½x5½	36x5	36x5d	W
Day-Elder E	5	4250	4½x6	36x5k	40x6dk	W
Dearborn E	1	1600	3½x5½	35x5n	35x5n	W
Dearborn FX	1½	2300	3¾x5½	34x4	34x5	W
Dearborn F	1½	2180	3¾x5½	34x4	34x5	W
Dearborn 48	2	2590	3¾x5½	34x4½n	34x7	W
Defiance G	1	1695a	3¾x5	35x5n	35x5n	B
Defiance D	1½	2095a	3¾x5	35x5n	36x6n	1
Defiance E	2	2275a	3¾x5	35x5n	38x7n	1
Denby 31	1¼	1485	3½x5	35x5n	35x5n	B
Denby 33	1½	2145	3¾x5	35x5n	38x7n	1
Denby 34	2	2395	3¾x5	36x3½	36x6	1
Denby 35	2½-3	2795	4½x5¼	36x4	36x7	1
Denby 27	4	3895	4½x5½	36x5	36x5d	1
Denby 210	5	4295	4½x5½	36x6	40x6d	1
Dependable A	¾-1	1050	3¾x5½	34x5n	36x6n	W
Dependable C	2	2350	3¾x5¼	34x3½	34x5	W
Dependable D	2½	2650	t x5½	34x5	36x6	W
Dependable E	3	2950	4¼x5½	36x4	36x7	W
Diamond T O-3	1-1¼	1975	3¾x5¼	36x3½n	36x4n	W
Diamond T T	1½	2250	3¾x5¼	36x3½	36x5	W
Diamond T U	2-2½	2650	t x5¼	36x4	36x7	W
Diamond T K	3½	3750	4¼x5½	36x5	36x5d	W
Diamond T EL	5	4325	4½x5½	36x6	40x6d	W
Diamond T S	5	4500	4¾x6	36x6	40x6d	W
*Diehl	A	1	....	31½x5	34x4½	35x5	1
Diehl	B	1½	....	31½x5	36x6	36x6	1
Doane		2½	4100b	4¼x5¾	36x5	36x7	C
Doane		3½	5100b	4¾x5¾	36x5	36x5d	C
Doane		6	6000b	5 x6¼	36x6	40x6d	C
*Dodge Brothers		¾	730	37x4½	32x4n	32x4n	B
Dorris K-4	2-2½	3400	4¼x5½	36x4	36x7	W
Dorris K-7	3½	4490	4¼x5½	36x5	36x10	W
*Dort 103	½	685a	3½x5	31x4n	31x4n	B
Double Drive B		3	4000	4¼x5½	6	6	W
Duplex A		2	2775	4 x5¼	35x5n	38x7n	W
Duplex E		3½	3500	4¼x5½	36x8	36x8	1
Eagle 101		1½	1875	3½x5½	34x5	34x5	1
Eagle 100-2		2	2275	3¾x5¼	34x4k	34x7k	1
F. W. D. B		3	4200	4¼x5½	36x6	36x6	B
Fageol 1½		1½	3000	3¾x5¼	34x3½k	34x6k	W
Fageol 2½		2½	3900	4¼x5¾	34x4	36x7	W
Fageol 3½		3½	5000	4½x6¼	36x5k	40x5dk	W
Fageol S		5	5700	4½x6¼	36x6	40x6d	W
Fargo R		2	1700	3¾x5	36x4	36x6	1
*Federal R2		1	1375	3¾x5	33x5n	33x5n	W
Federal SD		1½	1800	3½x5	35x5n	36x6n	W
Federal TE		1½	2175	4½x5¼	36x3½	36x5	W
Federal UE	2-2½	2425	4½x5¼	36x4	36x7	W
Federal WE	3½-4	3150	4½x5½	36x5	36x5d	W
Federal X2	5-6	4500	4¾x6	36x6	40x6d	W
*Ford TT	1	430	3¾x4	30x3½n	32x4½n	W
Front Drive C	1½	2800	3¾x5½	5	4	W
G & J** 20	1	2275	3¾x5½	34x5n	34x5n	W
G & J** A	2-2½	3375	4x5¼	36x4	36x7	W
G & J** B	3½-4	4475	4½x5½	36x5	36x10	W
G.M.C. K16	1	1295	3½x5½	34x5n	34x5n	B
G.M.C. K-41A	2	2375	4 x5½	36x4k	36x7k	W
G.M.C. K-41B	2	2375	4 x5½	36x4k	36x7k	W
G.M.C. K41-T	2	2450	4x5½	36x4	36x8	W
G.M.C. K-71A	3½	3600	4½x6	36x5	40x5d	W
G.M.C. K-71B	3½	3700	4½x6	36x5	40x5d	W
G.M.C. K71-T	3½	3700	4½x6	36x5	40x12	W
G.M.C. K-101A	5	3950	4½x6	36x5	40x6d	W
G.M.C. K101-T	5	4050	4½x6	36x5	40x14	W
G.M.C. K-101B	5	4050	4½x6	36x5	40x6d	W
G.W.W.	1½	1850	3¾x5½	35x5	35x5	1
*Garford 15	1	1890	3½x5½	34x5n	34x5n	W
Garford 25-B	1½	1990	3¾x5½	36x3½	36x5	W
Garford 70-H	2½	2750	4¼x5½	36x4	36x8	W
Garford 77-D	4	3750	4½x6	36x5	36x5d	W
Garford 68D	5	4500	5 x6½	36x6	40x6d	W
Garford 150-A	7½	5200	5 x6½	36x6	40x7d	C
Gary F	1-1½	1675	3¾x5	36x3½	36x5	W
Gary I	2	2250	4 x5½	36x3½	36x6	W
Gary J	2½	2650	4¼x5½	36x4	36x8	W
Gary K	3½	3650	4½x6	36x5	40x5d	W
Gary M	5	4100	5 x6½	36x6	40x6d	W
Gersix M	1½	3100	4 x5½	36x3½	36x7	W
Gersix K	2½	3500	4½x5½	36x4	36x8	W
Gersix	3½	$4500	4½x6	36x5	40x12	W
Graham Bros.	1	1265	3½x4½	33x4½n	34x5n	B
Graham Bros.	1½	1325	3½x4½	33x4½n	36x6n	B
1Gramm-Pion. 10	1	1245	3½x5	33x5n	33x5n	B
1Gramm-Pion. 15	1½	1750a	3¾x5	36x3½k	36x5k	1
1Gramm-Pion. 65	1½	2250a	3¾x5	36x3½k	36x5	W
1Gramm-Pion. 20	2	2475a	4½x5¼	36x4k	36x7k	W
1Gramm-Pion. 30	3	3300a	4¼x5½	36x4k	36x4dk	W
1Gramm-Pion. 75P	3½	4225a	4½x5½	36x6n	42x9n	W
1Gramm-Pion. 40	4	3850a	4½x5½	36x5	36x5dk	W
1Gramm-Pion. 50	5-6	4450a	4¾x6	36x6	40x6dk	W
Hahn B2	1	1750	3½x5	34x5k	34x5k	W
Hahn O	1½	2150	3¾x5¼	36x3½k	36x6k	W
Hahn K	2	2550	4½x5½	36x4k	36x7k	W
Hahn L	3	3350	4½x5½	36x5k	36x8k	W
Hahn M	5	3850	4½x5½	36x5	36x10	W
Hahn N	6	4250	4¾x6	36x6	40x12	W
Hal-Fur E	1½	2350	4x5½	34x5n	38x7n	W
Hal-Fur B	2½	3000	4¼x5½	36x6n	36x8	W
Hal-Fur F	3½	4000	4½x5½	36x6n	40x10	W
Hall 1½	1½	3100	3¾x5	34x5n	38x7n	W
Hall 2½	2½	3275	4¼x5¼	36x4	36x6	W
Hall 3½	3½	4100	4½x5½	36x5	36x5d	W
Hall 5	5	5100	4½x5½	36x5	40x6d	W
Hall 7 chain	7	5100	4½x5½	36x5	40x6d	C
Harvey WOA	2	2650	4¼x5½	34x4	34x7	W
Harvey WFA	2½	2950	4¼x5½	36x4	36x7	W
Harvey WHA	3½	3950	4½x6	36x5	36x5d	W
Hawkeye K	1½	1850	3¾x5½	34x3½k	34x5k	1
Hawkeye M	2	2650	4¼x5	36x4k	36x6k	1
Hawkeye N	3½	3700	4½x6¾	36x5k	36x10k	1
Hendrickson O	1½	2200	3¾x5½	36x4n	36x5n	W
Hendrickson N	2½	2690	4¼x5¾	36x4k	36x7k	W
Hendrickson M	3½	3000	4¼x5	36x5k	36x5dk	W
Hendrickson K	5	4000	5 x6¼	36x6	40x6	W
Huffman B	1½-2	1795	3¾x5	34x3½	34x6	W
Huffman C	1½-2	1695	3¾x5½	36x3½	36x6	1
Huffman D	2-3	2895	4¼x5½	36x4	36x7	
Hurlburt A-A	1-1½	1950	3¾x5	34x5n	34x5n	W
Hurlburt B-B	2-2½	2800	4¼x5½	36x4	36x4d	W
Hurlburt C-C	3-3½	3475	4¼x5½	36x5	36x5d	W
Hurlburt D-D	4-4½	4150	4½x6	36x5	36x6d	W
Hurlburt E-E	6-6½	4850	4¾x6½	36x6	40x6d	W
Indep'd't(Iowa) B	1	1665	3½x5	34x3½	34x4	1
Indep'd't(Iowa) C	1½	2040	3¾x5¼	34x3½	34x5	1
Indep'd't(Ia.) HI	2½	2940	4½x5¼	36x4	36x7	1
Indep'd't(Ohio) F	1½	2385	3¾x5	36x3½	36x5	W
Indep'd't(Ohio) H	2½	3085	4½x5½	36x4	36x4d	W
Indep'd't(Ohio) K	3½	3985	4½x5½	36x5	36x5d	W
Indiana 12	1½-2	....	3¾x5¼	34x3½k	34x5k	W
Indiana 20	2	....	4½x5½	36x4k	36x7k	W
Indiana 25	2½-3	....	4½x5½	30x4k	36x8k	W
Indiana 35	3½-4	....	4¾x5½	36x5k	36x5dk	W
Indiana S	5-7	....	5 x6¼	36x5k	40x6dk	W
*International S	1	1250	3½x5	34x5n	34x5n	1
International 21	1	1550	3½x5½	36x3½	36x3½	1
International 31	1½	1650	3½x5¼	36x3½	36x4	1
International 41	2	2100	3½x5½	36x3½	36x5	1
International 61	3	2400	4½x5	36x4	36x6	1
International 101	5	3600	4¼x5	36x5	40x10	1
Jackson 4WD	3½	3850	4½x5½	36x7	36x7	B
Jumbo 15	1½	2295	3¾x5¼	36x3½	36x5	1
Jumbo 20	2	2520	3¾x5¼	35x5n	38x7n	1
Jumbo 25	2½	2660	4½x5½	36x4	36x7	1
Jumbo 30	3	3060	4¼x5½	36x6n	42x9n	1
Jumbo 35	3½	3900	4½x6	36x5	36x10n	1
Jumbo 40	4	4400	4½x6	38x7n	44x10	1
K-Z 1	1	1750	3½x5	34x3½	34x5	W
K-Z 1½	1½	2075	3¾x5	36x4	36x6	W
K-Z 2½	2½	2550	4½x5¼	36x4	36x8	W
K-Z 3½	3½	3350	4½x5½	36x5	40x10	W
K-Z 5	5	3850	4½x5½	36x6	40x6d	W
Kalamazoo T	1	1295	4 x5	34x5	34x5n	B
Kalamazoo G-1	1½	1800	3¾x5	34x4	34x5	W
Kalamazoo LG	2	2645	4 x5	36x4	36x7	W
Kalamazoo NH	3	3145	4 x6	36x5	36x10	W
Kalamazoo HD	3	3350	4¼x6	36x5	36x10	W
Kalamazoo SK	4	3845	4¼x6	36x5	36x12	W
Kalamazoo OK	5	4350	4½x6	36x6	40x6d	W
2Kelly-S K-31	1½	2700	3¾x5¼	36x3½	36x6	G
2Kelly-S K-34	1½	2700	3¾x5¼	36x3½	36x6	W
2Kelly-S K-38	2½	2900	3¾x5¼	36x4	36x4d	W
2Kelly-S K-35	2½	2900	3¾x5¼	36x4	36x4d	C
2Kelly-S K-40	3½	3900	4½x6½	36x5	40x5d	C
2Kelly-S K-41	3½	3900	4½x6½	36x5	36x10	I
2Kelly-S K-42	3½	3900	4½x6½	36x5	40x5d	W
2Kelly-S K-50	5	4400	4½x6½	36x6	40x6d	C
2Kelly-S K-60	6	4600	4½x6½	36x6	40x7d	C
2Kelly-S K-61	5-7	4800	4½x6½	36x6	36x7d	I
Keystone 40	2	2175	3¾x5½	34x5n	38x7n	I
Kimball AB	2	3675	4 x6	36x4	36x7	W
Kimball AC	2½	3975	4¼x6	36x4	36x8	W
Kimball AK	3	4500	4½x6	36x4	36x10	W
Kimball AE	4	5000	4¾x6	36x5	40x12	W
Kimball AF	5	5500	5 x6	36x6	40x7d	W
*Kissel Express	1	1585	3½x5½	34x5n	34x5n	W
Kissel Utility	1½	1975	3½x5½	36x3½	36x5	W
Kissel Freighter	2½	2875	4¼x5½	36x4	36x7	W
Kissel H. D.	4	3675	4¼x5½	36x5	36x5d	W
Kleiber AA	1	2200	4½x5¼	34x3½k	34x5k	W
Kleiber A	1½	3100	4½x5¼	36x3½k	36x6k	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.
r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl.
d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac.—tractor.

1—Gramm-Pioneer, 2—Kelly-Springfield.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Kleiber.....BB	2	$3600	4½x5¼	36x4k	36x7k	W
Kleiber.....B	2½	3950	4½x5½	36x5k	36x8	W
Kleiber.....C	3½	4600	4½x5½	36x5	36x5d	W
Kleiber.....D	5	5300	5 x6½	36x6	40x12	W
Koehler.....D	1½	2150	3½x5	34x3½	34x5	W
Koehler.....M	2½	3175	4 x5½	36x4	36x7	W
Koehler.....MCS	2½	3275	4 x5½	36x4	36x7	W
Koehler.....F	3½	4470	4½x5½	36x5	36x10	W
Koehler,MT. Trac	5	3275	4 x5½	36x4	36x7	W
Krebs.....23	¾	1260	3¾x5	34x4½	34x4½	B
Krebs.....24	1	1565	3¾x5	34x5	34x5	W
Krebs.....45	1½	2125	4½x5¼	36x4	36x7	W
Krebs.....75	2½	2375	4½x5½	36x4	36x8	W
Krebs.....110	3½	2975	4½x5½	36x5	40x10	W
Larrabee.....X-2	1	1925	3¼x4½	34x5n	34x5n	B
Larrabee.....U	1½	2100	3¾x5	34x3½	34x5	W
Larrabee.....J	1½-2½	2400	3¾x5	34x3½k	34x5k	W
Larrabee.....K	2½-3	3100	4½x5¼	36x4	36x7	W
Larrabee.....K-5	2½-3½	3150	4½x5½	36x4	36x8	W
Larrabee.....L-4	3½-5	4000	4½x5½	36x5	36x5d	W
Larrabee.....W	5-7	4800	4½x6	36x6	40x6d	W
Maccar.....L	1½	....	4½x5½	36x4	36x6	W
Maccar.....H-A	2	....	4½x5¼	36x4	36x4d	W
Maccar.....H-2	3	....	4½x5½	36x4	36x5d	W
Maccar.....M-3	4	....	4½x5½	36x5	36x6d	W
Maccar.....G	5-6	....	4¾x6	36x5	40x6d	W
MacDonald.....A	7½	5750	5½x6	40x7	40x14	I
Mack...AB D.R.	1½	3150	4 x5	36x4	36x3½d	D
Mack...AB Chain	1½	3000	4 x5	36x4	36x3½d	C
Mack...AB Chain	2	3300	4 x5	36x4	36x4d	C
Mack....AB D.R.	2	3750	4 x5	36x4	36x4d	D
Mack....AB D.R.	2½	3850	4 x5	36x4	36x4d	D
Mack...AB Chain	2½	3100	4 x5	36x4	36x4d	C
Mack...AC Chain	3½	4950	5 x6	36x5	40x5d	C
Mack...AC Chain	5	5500	5 x6	36x6	40x6d	C
Mack...AC Chain	6½	5750	5 x6	36x6	40x12	C
Mack...AC Chain	7½	6000	5 x6	36x7	40x7d	C
Mack Trac...AB	5	3100	4 x5	36x4	36x4d	C
Mack Trac....AC	7	4950	5 x6	36x5	40x5d	C
Mack Trac....AC	10	5500	5 x6	36x6	40x6d	C
Mack Trac....AC	13	5750	5 x6	36x6	40x12	C
Mack Trac....AC	15	6000	5 x6	36x7	40x7d	C
*Mapleleaf.....**	1½	3000	3¾x5¼	34x5n	36x6n	W
Mapleleaf...AA**	2	3600	4 x5½	36x4	36x7	W
Mapleleaf...BB**	3	4050	4½x5½	36x4	36x4d	W
Mapleleaf...CC**	4	4800	4½x5½	36x5	36x5d	W
Mapleleaf...DD**	5	5625	4½x5½	36x6	40x6d	W
Master.....JW	1½	2290	4½x5½	34x3½	34x5	W
Master.....JD	1½	2590	4½x5½	34x3½	34x5	D
Master.....Z	2	2290	4½x5½	34x3½	34x5	W
Master.....W	2½	2800	4½x5½	34x4	36x7	W
Master.....DD	2½	3190	4½x5½	34x4	36x7	D
Master.....A	3½	3900	4½x6	36x5	40x5d	W
Master.....E	3½	4290	4½x6	36x5	40x5d	D
Master.....Y	4	4490	4½x6	36x5	40x6d	D
Master.....B	5	4990	4¾x6½	36x6	40x6d	W
Master.....F	5	5030	4¾x6½	36x6	40x6d	D
MasterTrac.,DDT	6	3390	4½x5½	34x4	36x7	D
*Maxwell.....1½	1½	932	3⅝x4½	32x3n	32x4n	W
*Menominee.....	1	1650	4 x5	34x5n	34x5n	W
Menominee...HT	1-1¼	2000	3¾x5	34x3½	36x5	W
Menominee....H	1½	2175	4 x5	36x3½	36x5	W
Menominee....D	2-2½	2875	4 x6	36x4	36x8	W
Menominee....G	3½	3800	4½x6	36x5	36x10	W
Menominee...J-3	5	4250	4¾x6	36x6	40x12	W
Moline.....10	1½	1985	3½x5	34x5n	36x6n	I
3Moreland..R. R.	1	1595	4 x5	34x5n	34x5n	B
Moreland.....BX	1½	1980	4 x5	36x3½	36x6k	W
Moreland.....EX	2	2800	4½x5¼	36x4	36x7k	W
Moreland.....AX	3	3500	4½x5½	36x5	36x10k	W
Moreland.....RX	4½-5	4000	4¾x6	36x6	40x6	W
Nash.....2018	1-1½	1505	3¾x5¼	34x3k	34x4k	I
Nash.....3018	2-2½	2150	3¾x5¼	34x4k	34x7k	I
Nash.....Quad	2-2½	2750	4¼x5½	36x5k	36x5k	I
Nash. 3018, LWB	2-2½	2200	3¾x5¾	34x4k	34x7k	I
Nash. Quad. LWB	2-2½	2800	4¼x5½	36x5k	36x5k	I
Nash.....5018	2½	2250	3¾x5¼	34x4k	34x7k	I
4Nelson.....G2	1½	....	4½x5¼	36x3½	36x6	W
4Nelson.....G3	2½	....	4½x5¼	36x4	36x7	W
4Nelson.....G4	3½	....	4½x5½	36x5	36x5d	W
4Nelson.....G5	5	....	4¾x6	36x6	40x6d	W
Netco.....DK	2	3100	4½x5¼	36x4k	36x7k	W
Netco.....HL	2½	3500	4½x5½	36x4k	36x8k	W
Niles.....	E	2	3000	4½x5½	36x4k	36x7k	W
Noble.....A21	1¼	1840	3⅝x5⅛	34x5	34x5	W
Noble.....B31	1½-2	2480	3¾x5¼	36x4	36x7	W
Noble.....D51	2½-3	2950	4¼x5½	36x4	36x8	W
Noble.....E71	3½-5	3800	4½x6	36x5	36x10	W
Noble.....B30	1½	....	3¾x5¼	36x3½	36x5	W
Noble.....C40	2	....	4 x5½	36x4	36x7	W
Noble.....D50	2½	....	4¼x5½	36x4	36x8	W
Noble.....E70	3½	....	4½x6	36x5	36x10	W
Northwestern..W	1½	2700	4½x5¼	34x4	36x6	W
Northwestern.WS	2½	3500	4½x5½	36x4	36x8	W
Norwalk.....25E	1	1595	3½x5	34x3½	34x4	W
Norwalk.....35E	1½	1925	3½x5	34x3½	34x3½d	W
Norwalk,35E.Spec	1½	2285	3¾x5¼	34x3½	34x5	W
Ogden.....A2	1	....	3½x5	34x5n	34x5n	W
Ogden.....D	1½	....	3¾x5	36x3½	36x5	W
Ogden.....E	2½	....	4½x5¼	36x4	36xS	W

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Old Hickory...W	1	$1775	3¾x5	36x3½k	36x4k	W
Old Reliable....A	1½	2350	4 x5	34x4	36x6	W
Old Reliable....B	2½	3500	4¼x6	34x4	36x4d	W
Old Reliable....C	3½	4250	4½x6	36x5	36x5d	W
Old Reliable....D	5	5000	4½x6	36x6	40x6d	W
Old ReliableKLM	7	6000	4¾x6½	36x6	40x7d	C
*Oldsmobile Econ	1	1095	3½x5¼	35x5n	35x5n	I
Olympic.....	A	2½	3200	4¼x5½	36x4	36x8	W
Oneida.....B9	1½	2825	4 x5¼	36x3½	36x7	
Oneida.....C9	2½	3200	4 x5¼	36x4	36x8	
Oneida.....D9	3½	4050	4½x5½	36x5	36x10	
Oneida.....E9	5	4725	4½x5½	36x6	40x12	
Oshkosh.....A	2	3250	3½x5	36x6n	36x6n	B
Oshkosh.....AA	2	3400	3½x5	36x6n	36x6n	B
Oshkosh.....B	2½	3850	4 x5⅛	38x7n	38x7n	B
Oshkosh.....BB	2½	4000	4 x5⅛	38x7n	38x7n	B
*Overland.....	4	½	450	3½x4	30x3½n	30x3½n	B
Packard.....EC	2-3	3100	4¼x5½	36x4	36x7	W
Packard.....EX	2-2½	3100	4¼x5½	36x6n	40x8n	W
Packard.....ED	3½-4½	4100	4½x5½	36x5	36x5d	W
Packard.....EF	5-7½	4500	5 x5½	36x6	40x6d	W
Paige.....52-19	1½	1950	4 x5¼	34x3½	34x5	W
Paige.....54-20	2½	2120	4¼x5½	34x4	34x8	W
Paige.....51-13	3½	3145	4½x5½	36x5	36x5d	W
Parker.....C-22	1	1875	3¾x5¼	34x5n	34x5n	W
Parker.....G-22	2½	3200	4¼x6	34x4	36x4d	W
Parker.....J-20	3½	3950	4½x6	36x5	40x5d	W
Parker.....M-20	5	4850	5 x6	36x6	40x6d	W
Patriot...Revere	1	1383	3¾x5	35x5n	35x5n	W
Patriot...Lincoln	2	2050	4 x5¼	34x3½	34x5	W
Patriot .Washgt'n	3	2900	4½x5½	36x4	36x7	W
Pierce-Arrow.....	2	3200	4 x5½	36x4	36x4d	W
Pierce-Arrow.....	3½	4350	4½x6¾	36x5	36x5d	W
Pierce-Arrow.....	5	4850	4½x6¾	36x5	40x6d	W
Pittsburgher.....	1½-2	3000	3⅝x5	36x4	36x6	..
Pittsburgher.....	3	3800	4½x5¼	36x5k	36x8	W
Power.....F	2	3150	3¾x5¼	36x5	36x7	W
Power.....C	3½	4250	4¼x5½	36x5	40x10	W
Premocar...B-143	1½	2475	3½x5	36x6n	36x6n	W
*Rainier.....R-21	¾	....	3½x5	35x5n	35x5n	W
Rainier.....R-29	1	....	3¾x5	34x3½	34x4	W
Rainier.....R-26	1½	....	3¾x5	34x3½	34x5	W
Rainier.....R-28	2	....	4½x5¼	34x4	34x6	W
Rainier.....R-20	2½-3	....	4½x5¼	34x4	34x7	W
Rainier.....R-15	3½-5	....	4½x5½	36x5	36x5d	W
Rainier.....R-17	5-6	....	4¾x6	36x6	40x6d	W
Ranger..TK-20-2	1½	2450	3¾x5	36x6n	38x7n	W
*Reo.....F	¾-1½	1245	3¼x4½n	34x4½n	34x4½n	B
Reliance.....10A	1½	2400	4 x5¼	36x3½	36x5	I
Reliance.....20B	2½	3100	4¼x5½	36x4	36x4d	I
Republic.....75	¾	1395b	3½x5	32x4½n	32x4½n	I
Republic.....10	1	1395	3¾x5	34x3	34x4	I
Republic..10 Exp	1	1695	3¾x5	34x5n	34x5n	I
Republic.....11X	1½	1795	3¾x5	34x4	34x6	I
Republic.....19	2½	2195	4½x5¼	36x4	36x7	I
Republic.....20	3½	3095	4½x5½	36x5	36x10	I
Rowe.....CW	1½	3000	3¾x5	36x6n	36x6n	W
Rowe....C.D.W.	2	3300	4 x5	34x4	36x3½d	W
Rowe....G.S.W.	3	4150	4 x6	34x5	36x5d	W
Rowe....G.P.W.	3	5250	3¼x5r	38x7n	42x9n	W
Rowe.....HW	4	4500	4¼x6	36x5	36x6d	W
Rowe.....F. W.	5	5500	4½x6	36x6	40x6d	W
Ruggles.....20	1	1195	3¾x5	34x5n	34x5n	B
Ruggles.....40	2	1795	4 x5	34x5n	34x7	D
Samson.....15	¾	....	4-3¼x4	32x4n	32x4n	B
Samson.....25	1¼	....	4-3¼x5½	35x5n	35x5n	B
Sanford....W-15	1½-2	2150b	3¾x5	36x3½k	36x5k	..
Sanford.....25	2½-3½	....	4½x5¼	36x4	36x4d	W
Sanford.....35	3½-5	....	4½x5½	36x5	36x5d	W
Sanford.....50	5-7	....	4¾x6	36x5	40x6d	W
Schacht....2-Ton	2	3200	4¼x5½	36x4	36x7	W
Schacht....3-Ton	3	3800	4¼x5½	36x5	36x5d	W
Schacht....4-Ton	4	4200	4½x6	36x5	40x5d	W
Schacht....5-Ton	5	4400	4½x6	36x5	40x6d	W
Schacht....7-Ton	7	5050	4½x6	36x6	40x7d	W
Schwartz.....A	1	1685	3½x5	34x4½n	34x4½n	B
Schwartz.....K	2	3000	3¾x5¼	34x3½	34x7	W
Schwartz.....L	3	3660	4¼x5½	36x4	36x8	W
Schwartz.....M	5	4900	4½x6	36x6	40x12	W
Selden.....30	1½-2½	2250	3¾x5	34x3½	34x5	W
Selden.....31	1½-2½	3350	4¼x5¼	34x5	38x7n	W
Selden.....50	2½-3½	3250	4½x5¼	36x4	36x7	W
Selden.....51	2½-3½	4350	4½x5½	36x6n	40x8n	W
Selden.....70	3½-5	3750	4½x5½	36x5	36x10	W
Selden.....90	5-7	4950	4¾x6	36x6	40x12	W
Seneca.....M	¾	820	3½x4½	30x3½n	30x3½n	B
*Service.....12	¾	....	3¼x4½	32x4½n	32x4½n	B
*Service.....15	1¼	....	3½x5	31x4½n	35x5n	B
Service.....21	1½	....	3½x5½	34x3½	34x5	W
Service.....32	2	....	4 x5½	36x3½	36x7	W

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Service.....37	2	....	4¼x5½	35x5n	38x7n	W
Service.....52	3	....	4¼x5½	36x4	36x8	W
Service.....72	3½	....	4¼x5½	36x5	36x5d	W
Service.....77	4	....	4½x6	36x5	36x5d	W
Service.....102	6	....	4½x6	36x6	40x6d	W
Signal.....NF	1	$1450	3¾x5	34x5n	36x6n	W
Signal.....H	1½	1950	4½x5¼	34x4	36x6	W
Signal.....J	2½	2375	4½x5¼	34x4	36x8	W
Signal.....M	3½	3175	4½x5½	36x5	40x5d	W
Signal.....R	5	3900	4¾x6	36x6	40x6d	W
Southern.....10	1	2090	3¾x5	34x3½	34x4	W
Southern.....15	1½	2590	3¾x5½	36x6n	34x4	W
Southern.....20	2	2990	4¾x5¼	36x6n	40x8k	W
*Standard.....75	1¼	1330	3¾x5	33x5n	33x5n	W
Standard.....1-K	1½	1600	3¾x5	34x3½k	34x5k	W
Standard.....76	2½-3	2400	4½x5¼	36x4k	36x7k	W
Standard.....66	3½-5	3150	4½x5½	36x5	36x10	W
Standard.....5-K	5-7	4400	4¾x6	36x6	40x12	W
*Star.....	½	610b	3½x4¼	30x3½n	30x3½n	B
Sterling.....1½	1½	2885	4 x5¼	36x3½k	36x5k	W
Sterling.....2	2	3085	4 x5¼	36x4k	36x6k	W
Sterling.....2½	2½	3290	4⅜x5¾	36x4k	36x4dk	W
Sterling.....3½	3½	4325	4½x6¼	36x5k	40x5dk	W
Sterling.....5-W	5	4950	5 x6¼	36x6	40x6d	W
Sterling.....5-C	5	5500	5 x6¼	36x6	40x6d	C
Sterling.....7½	7½	6000	5 x6¼	36x6	40x7d	C
*Stewart...Utility	¼-1½	1245	3½x5⅛	34x4½n	34x4½n	I
Stewart.....15	1½-1½	1445	3⅝x5⅛	35x5n	35x5n	I
Stewart.....9	1½-2	1790	3¾x5	34x3½	34x5	I
Stewart.....7	2-2½	2190	4½x5¼	34x4	34x7	I
Stewart.....7-X	2½-3	2390	4¼x5½	34x4	34x7	I
Stewart.....10	3½-4	3190	4½x5½	36x5	36x5d	I
Stewart.....10-X	3½-4	3190	4½x6	36x5	36x5d	I
*Stewart.....	1¼	1245	4-3¼x5½	34x4½	34x4½	
*Stoughton.....C	¾	1240	3½x5	34x4½n	34x4½n	B
Stoughton.....A	1	1790	3¾x5¼	34x5n	34x5n	W
Stoughton.....B	1½	2150	3¾x5¼	36x3½	36x5	W
Stoughton.....D	2	2490	4 x5½	36x4	36x7	W
Stoughton.....F	3	3150	4¼x5½	36x5d	36x5d	W
Sullivan.....E	2	2800	4¼x5½	36x4k	36x7k	W
Sullivan.....H	3½	3750	4½x6	36x5	36x5d	W
*Thomart.....	1¼	1795a	4 x5¼	34x5	34x5	C
Tiffin.....GW	1½	2100	4½x5¼	36x3½	36x5	W
Tiffin.....MW	2½	2700	4½x5¼	36x4	36x3½d	W
Tiffin.....PW	3½	3600	4½x5½	36x5	40x5d	W
Tiffin.....PW	5	4300	4¾x6	36x6	40x6d	W
Tiffin.....UW	6	4500	4¾x6	36x6	40x12	W
Titan.....	2	2750	4 x5	36x4k	36x7k	D
Titan.....	2½	2950	4¼x5¾	36x4k	36x8k	D
Titan.....	3½	3950	4½x6	36x5k	40x10k	D
Titan.....	5	4550	4½x6	36x5	40x12	D
Tower.....J	1½	2000a	4½x5¼	35x5n	38x7n	W
Tower.....H	2½	2475a	4½x5¼	36x4	36x7	W
Tower.....G	3½	3475a	4½x5½	36x5	36x5d	W
Traffic.....	1½	1595	3¾x5	35x5n	35x5n	I
Traffic.....C	2	1595	3¾x5	34x3½k	34x5k	I
Traffic.....	3	1895a	3¾x5	36x4	36x7	I
*Transport.....15	1	1295	3¾x5	32x4½n	32x4½n	B
Transport.....25	1½	1195	3¾x5½	34x3½k	34x4k	I
Transport.....35	2	1885	3¾x5	36x3½k	36x6k	I
Transport.....55	3	2385	4½x5¼	36x4k	36x8k	I
Transport.....60	3½	2585	4¼x5½	36x4k	36x8k	I
Transport.....75	5	3485	4½x6	36x5k	36x12k	I
Traylor.....B	1½	2390	3¾x5½	34x3½	34x5	W
Traylor.....C	2-2½	2850	4 x5½	36x4	36x7	W
Traylor.....D	3-3½	3300	4¼x5½	36x4	36x8k	W
Traylor.....F	5-6	4700	4½x6	36x6	40x6d	W
*Triangle.....AA	1	1235	3¼x5	34x4½n	34x4½n	I
Triangle.....A	1½-2	1985	3¾x5¼	34x3½k	34x6k	I
Triangle.....C	2-2½	2285	3¾x5¼	36x4k	36x7k	I
Triangle.....B	2½-3	2585	4 x5¼	36x4k	36x7k	I
Twin City...B.W.	2	2750	4 x5½	36x6	40x8	I
Twin City...AW.	3½	3950	4¼x6	36x5	40x5d	W
5Twin City.....B	3½	....	5½x6	36x6	36x6	I
5Twin City.....A	5	....	5½x6	36x7	36x7	I
Ultimate.....A	2	3150	4 x5½	36x3½	36x6	W
Ultimate.....AJ	2	3200	4½x5½	36x3½	36x6	W
Ultimate.....AJL	2	3250	4¼x5½	36x3½	36x6	W
Ultimate.....B	3	3700	4¼x5½	36x4	36x4d	W
Ultimate.....BL	3	3800	4¼x5½	36x4	36x4d	W
Ultimate.....D	5	5500	5 x6½	36x6	40x12	W
Union.....FW	2½	3190	4 x6	36x5k	36x8k	D
Union.....HW	4	4650	4½x6	36x6	40x12	D
United.....A	1½	2445	3¾x5¼	36x3½k	34x5k	W
United.....B	2½	3150	4¼x5½	36x4k	36x7k	W
United.....C	3½	3975	4¼x5½	36x5	36x5d	W
United.....V	5	4500	4½x6	36x6	40x6d	W
*United States..U	1	1875	3⅝x5⅛	34x5n	34x5n	B
UnitedStates,NW	1½	2225	3¾x5	36x5	36x3½	W
United States...N	1½	1975	3¾x5	36x3½k	36x5k	I
United States...R	3	3075	4 x5¼	36x4	36x4d	W
United States...S	4	3875	4½x5½	36x5	36x5d	W
United States...T	6	4850	4¾x6½	36x6	40x6d	W
Velie.....46	1½	1585	3¾x5	36x3½k	36x5k	I
Veteran.....M**	1½	2699	3¾x5¼	35x5n	35x5n	W
Veteran.....P**	2	3699	4¼x5½	36x4	36x7	W
Veteran.....R**	3	4200	4¼x5½	36x4	36x7	W
Veteran.....S**	4	5395	4½x6	36x5	36x10	W
*Vim.....29	½	1050	3½x4½	31x4n	31x4n	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.
r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. •—express, truck or delivery wagon. **—Canadian Make. trac.—tractor.

3—Moreland Road Runner. 4—Nelson Le Moon. 5—Twin City Four Wheel Drive.

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ace.....F	G-B..	4-3½x5	114	32x4	$1295	$1295	....	....	$2295
Ace.....L	H-S..	6-3¼x5	117	32x4	2260	2260	....	....	3680
Ace.....C	Cont..	6-3⅝x5¼	123	33x4½	2975	2975	....	....	4500
Ambassador.....R	Cont..	6-3⅝x5¼	136	33x5	....	b4500	$4500	....	6500
American.....C	H-S..	6-3¼x5	127	33x4½	b1995	1850	1925	....	2695
Anderson...Aluminum 6	Cont..	6-3½x4½	114	32x4	....	1195	....	....	....
Anderson.....Series 40	Cont..	6-3¼x4½	120	33x4	2195	1650	1795	$2450	2550
Apperson.....8-21-S	Own..	8-3¼x5	130	34x4½	....	2620	2645	3625	3695
Auburn.....6-51	Cont..	6-3⅝x4½	121	32x4	1575	1475	....	2275	2345
Auburn.....6-51	Cont..	6-3⅝x4½	121	32x4½	....	n1995	1545	....	....
Bay State.....	Cont..	6-3¼x4½	121	32x4	1800	1800	....	2400	2500
Bell.....4-32	H-S..	4-3½x5	114	31x4	1095	1095	....	....	....
Bell.....6-50	H-S..	6-3¼x5	124	32x4	1545	1545	....	....	....
Biddle.....B1 & B5	Buda..	4-3¾x5½	121	32x4	2950	b2950	....	3950	3950
Brewster.....91	Own..	4-4 x5½	125	32x4½	5000	5000	....	....	7000
Buick..1922-34-5-6-7-38	Own..	4-3⅝x4¾	109	31x4	865	885	u 725	1175	{1395 1325c
Buick....1922-41-4-5-47	Own..	6-3⅝x4½	118	33x4t	1175	1195	u975	1935c	1985
Buick.1922-48-9-50-4-55	Own..	6-3⅝x4½	124	34x4½	n1625v	n1675v	1435	1895	2195
Cadillac.....61	Own..	8-3½x5¼	132	33x5	3100	3150	3150	b3875	4100
Case.....X	Cont..	6-3⅝x4½	122	32x4½	1750	1790	....	2550	2690
Case.....W	Cont..	6-3⅝x5¼	129	34x4½	....	2200	2250	2850	3250
Chalmers.....1922	Own..	6-3¼x4½	117	32x4	1185	1185	....	1595	2295
Chalmers.....1922	Own..	6-3¼x4½	122	32x4	....	....	1345	....	....
Chandler.....Six	Own..	6-3½x5	123	33x4	1495	b1495	1645	b1595	2295
Chevrolet.....Superior	Own..	4-3⅛x4	102	30x3½	510	525	u425	{b840 k680	860
Chevrolet.....FB	Own..	4-3⅛x5¼	110	33x4	865	885	....	1325	1395
Cleveland.....41	Own..	6-3 x4½	112	32x4	1085	1095	n1260	1495	1585
Cole.....890	Nort..	8-3½x4½	127¼	33x5	2685	b2685n	2685	b3385	3685
Columbia.....De Luxe	Cont..	6-3⅝x4½	115	32x4	1475	1475	b1475n	b1925	1995
Columbia.....Light Six	Cont..	6-3½x4½	115	31x4	995	985	....	....	1395
Comet.....C-53	Cont..	6-3½x5¼	125	33x4½	....	1985	2085	....	2985
Crawford.....22-6-60	Cont..	6-3⅝x5¼	122½	32x4	3000	3000	3000	....	4500
Crawford-Dagmar...6-60	Cont..	6-3⅝x5¼	135	33x5	....	n3500	....	....	....
Daniels.....D-19	Own..	8-3½x5¼	132	33x5	a4350	b4350	4350	5250	6000
Davis.....71	Cont..	6-3⅛x4¼	114	31x4	....	1295	....	....	....
Davis.....61-67	Cont..	6-3⅝x4½	120	32x4	1595	1595	b1695	2095	2195
Dixie Flyer.....H-S-70	H-S..	4-3½x5	112	32x4	1175	1175	b1295	1545	1595
Dodge Brothers.....	Own..	4-3¼x4½	114	32x4	850	880	....	980h	1440
Dorris.....6-80	Own..	6-4 x5	132	33x5	....	b3900	3950	4985b	5750
Dort.....19-14	D-Ly..	4-3½x5	108	31x4	885	885	....	{1265 1045k	{1385 1095k
Driggs.....	Own..	4-2⅝x4½	104	30x3½	1275	1275	....	....	1975
Duesenberg...Straight 8	Own..	8-2⅞x5	134	33x5	6500	6500	6750	7800	7800
Du Pont.....A	Own..	4-3⅛x5½	124	32x4½	3000	3200	....	3800	4000
Durant.....A-22	Cont..	4-3⅞x4¼	109	31x4	n890	890	....	1365	1365
Durant.....B-22	Anst..	6-3¼x4½	123½	32x4½	1600	1650	....	2250	2400
Earl.....40	Own..	4-3 x5½	112	32x4	1485	1095	950u	b1395	1795
Elcar.....K-4	Lyc...	4-3½x5	118	33x4	1095	1095	n1095	1345	....
Elcar.....7-R	Cont..	6-3¼x4½	118	33x4	1395	1395	n1395	2065	2165
Elgin.....K-1	Falls..	6-3½x4¾	118	33x4	1345	1295	b1345	2195	2195
Essex.....	Own..	4-3⅝x5	108½	32x4	....	1095	....	1195k	{1895 1295k
Ford.....T	Own..	4-3¾x4	100	30x3½	r319	s348	u285	580	645
Franklin.....9-B	Own..	6-3½x4	115	32x4	1900	1950	u1750	2750	2850
Gardner.....T-R & G	Lyc...	4-3½x5	112	32x4	895	895	....	1095k	{1595 1345k
Grant.....	Own..	6-3⅛x4½	116	32x4	1385	1385	....	1895	1945
Gray.....	Own..	4-3⅝x4	100	30x3½	....	490	....	....	760
H.C.S.....Series 3	Weid..	4-3⅝x5½	120	32x4½	2475	2475	....	3250	3475
Halladay.....4	Own..	4-3½x5	115	32x4	1095	1095	....	1990	2085
Halladay.....6	Own..	6-3½x5	115	32x4	1595	1595	....	2295	2395
Handley-Knight.....	Own..	4-4½x4½	125	32x4½	....	....	2650	3450	3450
Hanson.....30	Cont..	6-3½x4½	114	31x4	....	995	....	....	....
Hanson Six.....60	Cont..	6-3⅝x4½	121	32x4	1595	1595	1795	b2475	2585
Hatfield.....A-42	H-S..	4-3½x5	115	32x4	....	1345	b1345	1950	1950
Haynes.....75	Own..	6-3½x5	132	34x4½	2395	b2395	2395	....	3395
Haynes.....55	Own..	6-3½x5	121	32x4½	1545	1495	....	2095	2395
Holmes.....Series 4	Own..	6-3½x4¾	126	34x4½	....	b2500	2500	b3300	3600
Hudson.....Super 6	Own..	6-3½x5	126	34x4½	....	b1645	1695	2570	{2650 1745k
Huffman.....	Cont..	6-3⅝x4½	120	32x4	1395	1395	....	....	2295
Hupmobile.....Series R	Own..	4-3¼x5½	112	32x4	1150	1150	u1025	{1635 1335k	1785
Jackson.....638	Cont..	6-3¼x4½	121	32x4½	....	1485	b1685	2985	2985
Jewett.....Six	Own..	6-3¼x5	112	31x4	s995	995	....	b1445	1465
Jordan.....MX	Own..	6-3 1/16x4¾	120	32x4	1895	1795	....	2785	2785
Kelsey.....4	Gray..	4-3½x5	111	32x3½	....	985	....	....	1450
Kelsey.....6	Walk'r	4-3½x4½	118	32x4	....	1525	....	....	2175
Kenworthy.....8-90	Own..	8-3 x5½	130	32x4½	5000	5000	5250	6000	6000
King.....K	Own..	8-3 x5	120	32x4½	1795	1795	b1795	2400	2550
Kissel.....45	Own..	6-3 1/16x5½	124	32x4½	n2385	1885	2385	b2975	3075
Kline Kar.....6-55-K	Cont..	6-3⅝x4½	121	33x4	1690	1690	1690	2750	2890
LaFayette.....	Own..	8-3¼x5½	132	33x5	3985	b4090	4090	5500	5500
Leach.....999	Own..	6-3⅜x5½	134	32x4½	5500	5500	5500	5500	5500
Lexington.....23	Anst..	6-3¼x4½	128	32x4½	1695	{1695 2045n	1795	b2345	2545
Lewis.....10 D	Own..	6-3½x5	117	32x4	1575	1395	1575n	{2085 1695k	2245

NAME AND MODEL	Engine Make	Cylinders Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Lincoln.....	Own..	8-3⅝x5	136	33x5	$3800	b3800	$3800	$4400	$4700
Locomobile.....48	Own..	6-4½x5½	142	35x5	....	b7600	7600	10500	11000
Maibohm.....B	Own..	6-3½x4½	116	32x4	1395	1395	b1495	2165	2165
Marmon.....34	Own..	6-3⅝x5½	136	32x4½	3385	b3185	3185	3985	4385
Maxwell.....	Own..	4-3⅝x4½	109	31x4	885	885	....	1385	1485
McFarlan.....1922	Own..	6-4½x6	140	33x5	6300	b6300	6300	7500	7500
Mercer.....Series 5	Own..	4-3¾x6⅜	132	32x4½	3950	b3950	c3950	4850	5250
Merit.....	Cont..	6-3¼x4½	119	32x4	1895	1895	....	....	....
Mitchell.....F-50	Own..	6-3½x5	120	33x4	a1590	1590	b1690n	b2050	2275
Mitchell.....F-50	Own..	6-3½x5	127	32x4½	....	....	1850	....	....
Monroe.....1922-S-9	Own..	4-3¾x4½	115	32x3½	950	950	....	....	....
Moon.....6-40	Cont..	6-3½x4¼	115	31x4	....	1295	....	....	1695
Moon.....6-58	Cont..	6-3⅝x4½	128	33x4½	1785	1785	1785	2785	2785
Nash.....691-96-97	Own..	6-3¼x5	121	33x4	1210	1240	b1395n	....	....
Nash.....692-94-95	Own..	6-3¼x5	127	34x4½	....	....	1390	b1890	2190
Nash Four.....41-4	Own..	4-3½x5	112	33x4	915	935	....	{a1385 1195k	{1545 1275k
National.....BB	Own..	6-3½x5¼	130	32x4½	a2475	b2475	2375	b3725	3825
Noma.....3C	Cont..	6-3¼x4½	128	32x4½	2500	b2500	c2600	....	3500
Noma.....1D	Bea..	6-3½x5¼	128	32x4½	3000	b3100	c3200	....	5500
Norwalk.....430-KS	Lyc...	4-3½x5	116	32x3½	....	1035	....	....	....
Oakland.....6-44	Own..	6-2 11/16x4¾	115	32x4	975	{995 u795	b1165n	{b1445 1185k	1545
Ogren.....6 T D Luxe	Cont..	6-3⅝x5¼	134	33x5	b3750	3750	3850	4500	4800
Oldsmobile.....43 A	Own..	4-3 11/16x5¼	115	32x4	1145	1145	b1265	1645	1795
Oldsmobile.....46	Own..	8-2⅞x4¾	122	33x4½	....	b1735	1735	....	2635
Oldsmobile.....47	Own..	8-2⅞x4½	115	32x4	1595	1595	b1595	2145	2295
Overland.....4	Own..	4-3⅜x4	100	30x3½	550	550	....	850	895
Packard.....Single-Six	Own..	6-3⅜x5	126	33x4½	2485	2485	u2250	3175	3275
Packard.....Single-Six	Own..	6-3⅜x5	133	33x4½	....	u2350	2685	....	3525
Packard.....Twin-Six	Own..	12-3 x5	136	35x5	3850	3850	3850	5240	5400
Paige.....6-44	Own..	6-3¼x5	119	32x4	1465	1465	u1290	1995	2245
Paige.....6-66	Cont..	6-3¾x5	131	33x4½	a2495	n2245	2195	3100	3155
Paterson.....22-6-52	Cont..	6-3⅝x4½	120	32x4½	....	1390	1425	2395	2395
Peerless.....56-S-7	Own..	8-3¼x5	125	34x4½	....	b2790	2790	3500	3790
Pierce-Arrow.....	Own..	6-4 x5½	138	33x5	5250	b5250	5250	6800	7000
Pilot.....6-59	H-S..	6-3¼x5	126	32x4½	2050	2000	2050	2950	3000
Premier.....6-D	Own..	6-3⅝x5½	126¾	33x5	3150	b3100	3250	4300	5100
Premocar.....6-40-A	Falls..	6-3½x4¼	117	32x4	1095	1095	....	1750	1825
R & V Knight.....R	Own..	4-3⅜x5	116	32x4	....	1665	....	2385	2475
R & V Knight.....J	Own..	6-3½x4½	127	32x4½	2475	b2475	2475	3015	3105
Reo Series.....T6 & U6	Own..	6-3½x5	120	33x4	1595	n1645	1485	b2355	2435
ReVere.....C	Dues..	4-4¼x6	131	32x4½	3200	3200	3200	....	4000
Rickenbacker.....A	Own..	6-3½x4¾	117	32x4	....	1485	....	1885	1985
Roamer.....6-54-E	Cont..	6-3½x5¼	128	32x4½	2850	b2585	2785	3850	3850
Roamer.....4-75-E	Dues..	4-4¼x6	128	32x4½	3985	b3585	b3750n	....	b4650
Rolls-Royce.....	Own..	6-4½x4¾	143½	33x5	....	10,900	....	....	....
Saxon.....125	Own..	4-3½x5	112	32x4	1195	1195	....	1795	1795
Sayers Six.....DP	Cont..	6-3¼x4½	118	33x4	1645	1645	....	2645	2645
Seneca.....L-2 & O-2	Lyc...	4-3½x5	108	30x3½	875	875	....	....	....
Seneca.....50 & 51	Lyc...	4-3½x5	112	31x4	1095	1095	....	....	....
Sperling.....A	Supr..	4-3⅝x5	114	32x4	980	980	....	1685	1685
Standard.....98	Own..	8-3¼x5	127	34x4½	2150	b2500	2500	2750	3200
Stanley.....	Own..	2-4 x5	130	32x4½	2700	2700	2700	3775	3950
Stanwood Six.....	Cont..	6-3½x4½	118	33x4	1765	1765	....	2750	....
Star.....	Cont..	4-3½x4½	102	30x3½	r319	s348	u285	580	645
Stearns-Knight....SKL4	Own..	4-3⅞x5⅝	125	34x4½	2250	2250	2450	3150	3450
Stearns-Knight.....6	Own..	6-3⅝x5	130	34x4½	2700	2700	2850	3350	3700
Stephens.....90	Own..	6-3¼x4½	122	33x4½	1575	b1595	c1625	2450	2550
Stevens-Duryea.....E	Own..	6-4 1/16x5½	138	35x5	7250	b6900	6800	u5600	b8900
Studebaker....Light Six	Own..	6-3½x4½	112	32x4	975	975	u785	1225	1550
Studebaker..Special Six	Own..	6-3½x5	119	32x4	1250	1275	b1275	1875	2050
Studebaker.....Big Six	Own..	6-3⅞x5	126	33x4½	u1300	1650	n1785	2275	2475
Stutz.....	Own..	4-4⅜x6	130	32x4½	2450	b2790	c2640	3490	4450
Templar.....A-445	Own..	4-3¾x5½	118	32x4	2025	2125	b2175	2650	2785
Tulsa.....E-1-2-3	H-S..	4-3½x5	117	33x4	1175	1175	....	....	....
Velie.....48	Cont..	6-3¼x4½	115	32x4	1585	1585	b1800	2485	2485
Velie.....34	Falls..	6-3½x4½	112	32x3½	1235	1235	....	1750	2085
Velie.....58	Own..	6-3½x4¼	115	32x4	1275	1275	....	2185	2185
Washington.....C	Cont..	6-3⅝x4½	120	32x4	....	1785	....	....	2285
Westcott.....C-48	Cont..	6-3½x5¼	125	32x4½	....	....	1890	....	2890
Westcott.....A-44	Cont..	6-3¼x4½	120	32x4	....	1690	n1890	....	2690
Wills Sainte Claire..A-68	Own..	8-3¼x4	121	32x4½	2475	2475	....	3275	3475
Willys-Knight.....20	Own..	4-3⅝x4½	118	32x4	1350	1375	....	1875	2095
Winton.....40	Own..	6-3¾x5½	132	35x5	3400	n3600	3400	b4450	4550

a—3-passenger. b—4-passenger. c—6-passenger. n—Sport. h—All Metal Type. k—Soft Top Type. u—Chassis Price. r—Price without starter and demountable rims. Price with starter and demountable rims $414. s—Price without starter and demountable rims. Price with starter and demountable rims $443. t—Model 47-34x4½ Tires. v—Tire Sizes 32x4½. c—Touring Sedan.

Engine Make: Anst—Ansted. Bea—Beaver. Cont—Continental. Curt—Curtis. D.Ly—Dort Lycoming. G-B—Grey Beal. H-S—Herschell-Spillman. Lyc—Lycoming. Nort—Northway. Roch—Rochester. Rut—Rutenberg. Supr—Supreme. Weid—Weidely. Wisc—Wisconsin

Jacobs Quality Chucks

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This advertisement inserted in the interest of better Service Equipment in general and the use of Portable Electric Drills in particular

"The Well-Equipped Shop Gets the Business"

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Vim.....30	1½	$1175	3½x4½	32x4½	32x4½	W
*Vim.....53	½-¾	995	4 x5	32x4n	32x4n	B
Vim.....31	1	1975	3¾x5½	35x5n	35x5n	W
Vim.....22	2	3150	3¾x5½	36x4	36x6	W
Vim.....23	3	3950	4¼x5½	36x5	36x5d	W
Walker-JohnsonA	2	2250	3¾x5	34x3½	34x6	W
Walker-JohnsonB	3	2750	4¼x5½	36x4	36x8	W
Walker.....M	2½	3850	4½x5¾	36x4	36x8	D
Walker.....S	5	4850	4½x6¼	36x6	40x6d	W
*Watson.....C	1	1465a	3⅝x5½	35x5n	35x5n	W
Watson.....N	3½	4250	4½x5½	36x5	36x10	W
Western....W1½	1½	2550	4½x5½	36x3½k	36x5k	W
Western....L1½	1½	2550	3¼x5	36x3½k	36x5k	W
Western....W2½	2½	3250	4½x6	36x4	36x7	W
Western....L2½	2½	3250	4¼x6	36x4	36x7	W
Western....W3½	3½	4250	4½x6	36x5	40x5d	W
*White.....15	¾	2400	3¾x5½	34x5n	34x5n	B
White.....20	2	$3250	3¾x5½	36x4k	36x7k	D
White.....40	3½	4200	3¾x5¾	36x5	40x5d	D
White.....45	5	4500	4½x5¾	36x6	40x6d	D
White Hick....E	1	1225	3¼x5	34x5n	34x5n	W
White Hick....H	1½	1375	3¼x5	36x3½	36x5	W
White Hick....K	2½	1675	4½x5¼	36x4	36x5	W
Wichita.....K	2	1875	4¾x5¼	36x3½	36x4k	W
Wichita.....M	1	2400	4¼x5¼	36x3½k	36x6k	W
Wichita.....RX	3	3200	4½x5¾	36x4k	36x8k	W
Wichita.....O	4	$3500	4½x6¼	36x5k	36x5k	W
Wilcox.....AA	1	1900	3¾x5½	36x1k	36x4k	W
Wilcox.....BB	1½	2550	4¼x5	36x4	36x5	W
Wilcox.....D	2½	3000	4¼x5	36x4k	36x3½dk	W
Wilcox.....E	3½	3950	4½x6	36x5k	36x5dk	W
Wilcox.....F	5	4350	4¾x6½	36x5	40x6d	W
Wilson.....F	1½	2270	3¾x5	36x3½	36x5	W
Wilson.....EA	2½	2825	4½x5¼	36x4	36x7	W
Wilson.....G	3½	3685	4½x5½	36x5	36x5	W
Wilson.....H	5	4520	4¾x6	36x6	40x6	W
*Wisconsin.....A	1	1750	3¾x5	34x5n	34x5n	W,B
Wisconsin.....B	1½	2100	3¾x5	35x5	36x6	W
Wisconsin.....C	2½	2750	4 x5¾	36x6n	36x7	W
Wisconsin.....D	3½	3000	4⅝x5¾	36x6n	40x8	W
Wisconsin.....E	5	3500	4½x6¼	36x6	36x10	W
Wisconsin.....F	7	4000	5 x6¼	36x6	36x12	W
Witt-Will.....N	1½	2450	3¾x5	36x3½k	36x5k	W
Witt-Will.....P	2½	2900	4½x5¼	36x3½k	36x7k	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.
r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment, b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac—tractor.

Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity
Allis-Chal.G.P	6-12	$250	2	LeR.	4-3½x4½	Gas.	1
Allis-Chalm..	15-25	1185	4	Midw.	4-4½x5¼	Gas.	3
Allis-Chalm..	20-35	1885	4	Own	4-4¾x6½	GorK	3-4
‡Allis-Chalm..	20-35	2085	4	Own	4-4¾x6½	G	4
Allwork...2-G	14-28	1595	4	Own	4-4¾x6	GorK	3
Allwork.....C	14-28	1395	4	Own	4-5 x6	GorK	3
¶ARO.1921-22	3-6	385	4	Own	1-4½x5	Gas.	1
Aultman-T....	15-30	1900	4	Clim.	4-5 x6½	G,K	4
Aultman-T....	22-45	2800	4	Own	4-5½x8	G,K	6
Aultman-T....	30-60	4000	4	Own	4-7 x9	G,K,D	8-10
Automot. B-3.	12-24	1250	4	Herc.	4-4 x5½	Gas.	2-3
Avery,Sft.Cul.	5-10	....	4	Own	4-3 x4	G,K	..
Avery..Cult-C	....	....	3	Own	6-3 x4	G,K	..
Avery.....B	5-10	....	4	Own	4-3 x4	G,K	2
Avery.....C	....	....	4	Own	6-3 x4	G,K	..
Avery.....	8-16	....	4	Own	2-5½x6	G,K,D	2-3
Avery.....	12-20	....	4	Own	4-4½x6	G,K,D	3-4
‡Avery.....	....	....	*	Own	4-4x5½	G,K,D	3
Avery.....	12-25	....	4	Own	2-6½x7	G,K,D	3-4
Avery.....	14-28	....	4	Own	4-4½	G,K,D	3-4
Avery.....	18-36	....	4	Own	4-5½x6	G,K,D	4-5
Avery.....	25-50	....	4	Own	4-6½x7	G,K,D	5-6
Avery.....	45-65	....	4	Own	4-7¾x8	G,K,D	8-10
Bates Mule..H	15-25	....	4	Midw	4-4¼x5¼	Gas.	3
Bates Mule..F	18-25	....	*2	Midw	4-4¼x5¼	Gas.	3
‡Bates MuleG	25-35	....	*2	Midw	4-4½x6	Gas.	..
Bear.....	25-35	4250	*2	Ste.	4-4¾x6½	Gas.	4
¶Beeman....G	2-4	240	4	Own	1-3½x4½	Gas.	....
Best.....	30	....	*2	Own	4-4¾x6½	G,K,D	4
Best.....	60	....	*2	Own	4-6½x8½	G,K,D	8-9
Boring.....	5-10	395	4	LeR.	4-3½x4½	G	..
Boring...1921	....	1850	3	Wauk	4-4⅜x5¾	GorK	2
Burn-Oil, 1922	15-30	1395	4	Own	2-6¾x7	Ker.	3-4
Capital.....	15-30	1000	2	Own	4-4¼x6	Gas.	3
Case.....	12-20	1050	4	Own	4-4½x5	G,K,D	3
Case.....	12-20	....	..	....	4-4½x5	..	2
Case.....	15-27	1320	4	Own	4-4½x6	G,K,D	3-4
Case.....	22-40	2550	4	Own	4-5½x6¾	G,K,D	4-5
Case.....	40-72	5200	4	Own	7 x8	G,K,D	8-10
Caterpillar T35	15	....	*2	Own	4-4 x5½	Gas.	3
Caterpillar .5T	25	....	*2	Own	4-4¾x6	Gas.	4
Caterpillar 10T	40	....	*2	Own	4-6½x7	Gas.	6
Centaur.....	5-2½	345	2	N Way	2-4½x4½	GorK	1
Chicago....40	40	2500	4	Own	4-4½x6	Gas.	4
Cletrac.....F	9-16	595	*2	Own	4-3¼x4½	G,K,D	2
Cletrac.....W	12-20	1345	*2	Own	4-4 x5½	G,K,D	2-3
Dakota.....4	15-27	1500	3	Dom.	4-4¾x6	Gas.	3
Depue.....A	20-30	2500	4	Buda	4-4½x6	Gas.	4
Dill.....D	20	2380	4	Cont.	4-4½x5½	Gas.	3
Dill.....R.W.	20	2980	4	Midw.	4-4½x6	Gas.	3
Do-It-All....A	3-6	495	..	Own	1-4½x5	Gas.	1
Eagle.....F	12-22	....	4	Own	2-7 x8	GorK	3-4
Eagle.....H	16-30	....	4	Own	2-8 x8	G or K	4-5
E-B.....AA	12-20	1095	4	Own	4-4¾x5	G,K,D	3
Fageol.....D	9-18	1525	4	Lyc.	4-3½x5	Gas.	2
Farm Horse.B	18-30	1885	4	Clim.	4-5 x6½	G,K	4
Farquhar....	15-25	....	4	Buda	4-4½x6	G,K,D	3-4
Farquhar.....	18-35	....	4	Own	4-6 x8	G,K,D	4-5
Farquhar.....	25-50	....	4	Own	4-7 x8	G,K,D	6-7
Fitch..4 Drive	20-35	1850	4	Clim.	4-5 x6½	GorK	3-4
Fordson.....	-18	$ 395	4	Own	4-4x5	G,K	2
Franklin....G	18-30	4000	*2	Clim.	4-5 x6½	G or K	3-4
Franklin....C	18-30	3350	*2	Clim.	4-5 x6½	G or K	3-4
Franklin...G2	18-30	4350	2	Clim.	4-5 x6½	G or K	3-4
Frick.....A	12-20	....	4	Erd.	4-4 x6	G,K	2-3
Frick.....C	15-28	....	4	Beav.	4-4¾x6	G,K	3-4
Grain Belt....A	18-36	2150	4	Wauk.	4-4¾x6¾	G or K	4
Gray.....	20-36	1975	3	Wauk.	4-4½x6¼	Gas.	4
Gray.....	22-44	2165	3	Wauk.	4-5 x8¼	Gas.	4-5
Gt. Western Si	20-30	1950	4	Beav.	4-4¾x6	K	4
Hart-Parr..20	20	765	4	Own	2-5½x6½	K,D.	2
Hart-Parr..30	30	895	4	Own	2-6½x7	K,D.	3
‡Hart-Parr....	....	1695	4	Own	6½x7	K,D.	..
Heider.....D	9-16	870	4	Wauk	4-4¼x5¾	G,K	2
Heider.....C	12-20	995	4	Wauk	4-4½x6¾	G,K	3
Heider...Cult	5-10	800	4	LeR.	4-3½x4½	Gas.	1
Huber Light 4.	12-25	935	4	Wauk	4-4½x5¾	G or K	3
Huber Super 4	15-30	1885	4	Midw.	4-4½x6	Gas	3
Illinois.....C	15-30	....	4	Clim.	4-5 x6½	G,K	4
Indiana.....F	5-10	665	2	LeR.	4-3½x4½	Gas.	1-2
International..	8-16	†670	4	Own	4-4¼x5	G,K,D	2
Internatl.Titan	10-20	†700	4	Own	2-6½x8	G,K,D	3
International..	15-30	1750	4	Own	4-5¼x8	G,K,D	4
J-T.....N	25-40	3000	*2	Clim.	4-5x6½	G,K,D	3-4
¶Kinkade....	1½	190	1	Own	1-3 x3	Gas.	....
La Crosse.....	12-24	985	2	Own	2-6 x7	G,K	3
Lauson.....5	12-25	1295	4	Midw.	4-4½x5¼	Gas.	3
Lauson.....21	15-30	1675	4	Beav.	4-4¾x6	G or K	3-4
‡Lauson Road	15-30	2000	4	Beav.	4-4¾x6	K	....
Leader.....B	12-18	685	4	Own	2-6 x6¼	G,K,D	2-3
Leader.....N	16-32	1725	4	Clim.	4-5 x6½	G,K	3-4
‡Leader...GU	18-35	2150	*2	Clim.	4-5 x6½	G,K	3-4
Linn.....H4J	40-	4500	*	Cont.	4-4½x5½	Gas	4
Linn.....W	60	5000	*	Wauk	4-5 x6¼	Gas	6
Little Giant..B	16-22	2200	4	Own	4-4½x5	K	4
Little Giant..A	26-35	3300	4	Own	4-5½x6	K	6
Lombard.1922	85-150	8950	*2	Wisc.	6-5½x6¾	Gas.	16
Lombard.1922	50	5300	*2	Wisc.	4-4¾x6½	Gas.	6-10
MerryGar1922	2	210	2	Evin	1-2¾x2½	Gas.	..
Minne...All-P	12-25	800	4	Own	4-4½x7	G or K	3
Minne. Gen.P	17-30	1600	4	Own	4-4¾x7	G or K	3-4
Minne. Med.D	22-44	2650	4	Own	4-6 x7	G or K	5-6
MinneHeavyD	35-70	3850	4	Own	4-7½x9	G or K	8-9
Mohawk .1922	8-16	650	2	Light	4-3½x4½	K or G	1-2
Moline Univ D	9-18	650	2	Own	4-3½x5	Gas.	2-3
Moline Orch..	9-18	....	2	Own	4-3½x5	Gas.	2-3
‡Monarch....	20-30	3500	*2	Beav.	4-4¾x6	G,K,D	4
Motor Macult.	1½	195	2	Own	1-2¾x3½	Gas.	..
NB.....1	3-6	425	4	Own	2-3¾x4	Gas.	1
Nichols-Shep.	20-42	2650	4	Own	8 x10	G or K	3-6
Nichols Shep.	25-50	3000	4	Own	9 x12	G or K	4-7
Nichols-Shep.	35-70	3650	4	Own	-10½x14	G or K	8-10
Nilson Senior..	20-40	1975	5	Wauk	4-5 x6¼	G,K	4
Oil Pull.....K	12-20	....	4	Own	2-6 x8	K,D	3
Oil Pull.....H	16-30	....	4	Own	2-7 x8½	K,D	4
Oil Pull.....G	20-40	....	4	Own	2-8 x10	K,D	5-6
Oil Pull.....E	30-60	....	4	Own	2-10x12	K,D	8-10
¶Oldsmar..K	2½-5	$225	4	Own	1-5½x5½	Gas.	1
Peoria.....L	12-25	1600	4	Clim.	4-5 x6½	G,K	3
Pioneer.....G	18-36	1750	4	Own	4-5½x6	G,K,D	4
Pioneer.....C	40-75	3550	4	Own	4-7 x8	Gas.	10
Plowman....A	15-30	1295	4	Buda	4-4½x6	G,K	3-4
Reliable.....	10-20	390	4	Own	2-6 x7	Ker.	2
Rex.....	12-25	1600	4	Wauk	4-4¼x5¾	G or K	3
Russell.....	12-21	1500	4	Own	4-4½x5¾	G or K	2-3
Russell.....	15-30	2200	4	Own	4-5 x6½	G or K	3-4
Russell.....	20-35	3000	4	Own	4-5½x7	G or K	4-5
Russell.....	30-60	5000	4	Own	4-8 x10	G or K	8-10
Samson....M	....	445	4	Own	4-4 x5½	G,K	2
Sandusky....J	10-20	1250	4	Own	4-4¼x5¼	G,K,D	2
Sandusky....E	15-35	1750	4	Own	4-5 x6½	G,K,D	4
¶Shelby.....	1	150	3	B & S	1-2½x2½	G	..
Shelby.....D	15-30	....	4	Beav.	4-4¾x6	G,K	3
Shelby.....C	9-18	....	4	Wauk	4-3⅝x5¼	G or K	2
Steady Pull..	12-21	1185	4	Own	4-4 x5	Gas.	3
Tioga.....3	18-32	....	4	Wisc.	4-4½x6	Gas.	3-4
Toro Cultivator	6	750	3	LeR.	4-3½x4½	Gas.	2
ToroTractor'22	6-10	495	3	LeR.	4-3½x4½	Gas.	2
Townsend.....	10-20	800	2	Own	4-6½x7	Ker.	2-3
Townsend.....	15-30	1350	2	Own	4-7 x8	Ker.	3-4
Townsend.....	25-50	2500	2	Own	4-8½x10	Ker.	4-8
Traction Motor	40-50	....	4	....	8-3¼x5	Gas.	4-5
Traylor....TB	6-12	500	4	LeR.	4-3½x4½	Gas.	1-2
Trundaar....10	25-40	3750	*2	Wauk	4-5 x6¼	G or K	4
Twin City.....	12-20	1200	4	Own	4-4¼x6	G,K	3
Twin City.....	20-35	2750	4	Own	4-5½x6¾	G,K	5-6
Twin City.....	40-65	4750	4	Own	4-7¾x9	G,K	8-10
Uncle Sam C20	12-20	1105	4	Weid.	4-4 x5½	G	2-3
Uncle Sam B19	20-30	1985	4	Beav.	4-4¾x6	G or K	3-4
Uncle Sam D21	20-30	1895	4	Beav.	4-4¾x6	G or K	3-4
Utilitor....501	2½-4	295	4	Own	1-3½x4½	G	1
Utilitor...501A	2½-4	340	4	Own	1-3½x4½	G	1
Wallis.....K	15-25	....	4	Own	4-4¼x5¾	G,K	3
Waterloo....N	12-25	675	4	Own	2-6½x7	Ker.	3
Wetmore21-22	12-25	1185	4	Wauk	4-4 x5¾	G,K	3
Whitney....D	9-18	595	4	Own	2-5½x6½	Gas.	2
Wichita.....T	15-30	2000	4	Beav.	4-4½x6	G,K,D	3-4
Wisconsin...E	16-30	1850	4	Clim.	4-5 x6½	G or K	3
Wisconsin...F	20-40	2050	4	Wauk	4-5 x6½	G or K	4
Wisconsin...H	22-40	2550	4	Clim.	4-5½x7	G or K	4-6
Yuba....12-20	12-20	2400	*2	Wisc.	4-4½x6¾	G,K,D	3
Yuba....15-25	15-25	2750	*2	Wisc.	4-4¼x6	G,K,D	..
Yuba....20-35	20-35	3900	*2	Wisc.	4-5¾x7	G,K,D	4
Yuba....25-40	25-40	4250	*2	Wisc.	4-5¾x7	G,K,D	..
‡Yuba.....	25-40	4750	*2	Yuba	4-5¼x7	D	..
Zelle.....	12-25	....	4	Buda	4-4¼x5½	G or K	3

ABBREVIATIONS: G—Gasoline. K—Kerosene. D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Make: Beav.—Beaver. B & S—Briggs & Stratton. Clim.—Climax. Cont.—Continental. Dom.—Domas Evin.—Evinrude. Herc.—Hercules. LeR.—LeRoy. Midw.—Midwest. Nway.—New Way. Nor.—Northway. Ste.—Stearns. Wauk.—Waukesha. Weid.—Weidely. Wis.—Wisconsin. *—Crawler type. All others are wheel type. †Price includes plows §Track Runner. ‡Industrial Tractor. ¶Garden Tractor.